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THE IRON AGE

THE NATIONAL METALWORKING WEEKLY

January 19, 1950

ENGINEERING LIBRARY

JAN 19 1950

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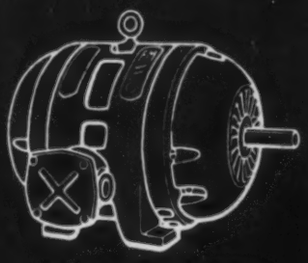
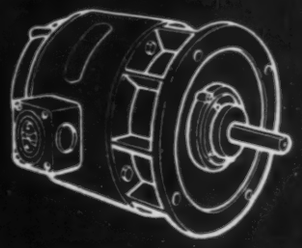


Explosion-Proof Motors

Motorgears



Flange-Mounted Motors

hen it comes to Motors...

stand to gain much in dealing with your Fairbanks-rse Branch or Dealer as the single source for *all* ur electric motor requirements. Not the least are the nefits of undivided responsibility, unprejudiced vice and application assistance. For your copy he handy "Pocket Panorama" which illustrates complete line . . . write Fairbanks, Morse & Co., icago 5, Illinois.

FAIRBANKS-MORSE

A name worth remembering

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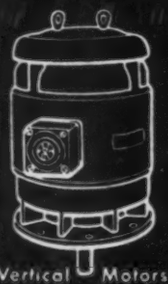
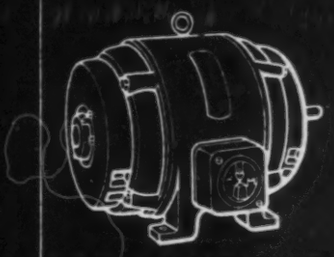
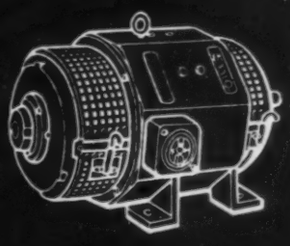


Vertical Motors

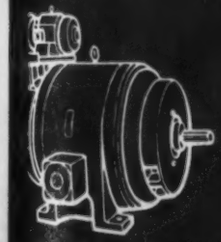


General-Purpose Ball-Bearing Motors

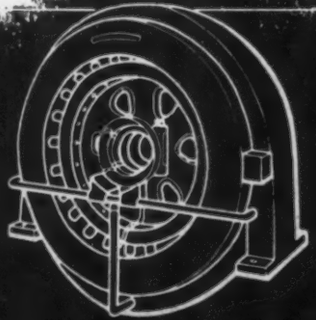
Axial Air Gap Motors



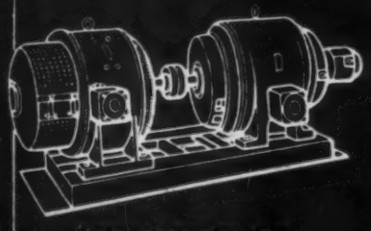
D.C. Motors



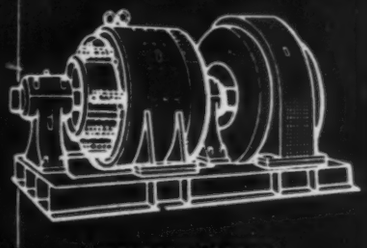
Speed A.C. Generators



Low-Speed A.C. Generators

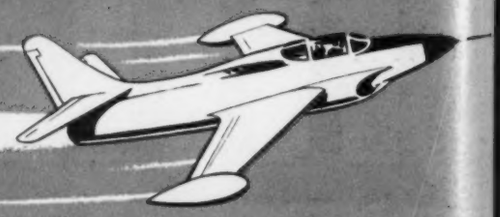


Motor Generator Sets



Frequency Changer

SMOOTH POWER



IS IMPORTANT IN CRANES, TOO

FLUID DRIVE in NEW WHITING CRANE Eliminates Shock - Reduces Wear

The spectacular performance of modern jet aircraft depends upon the *smoothness* of the tremendous power released by their engines. In overhead cranes, too, this smoothness of operation is important. Sudden shocks at starting loosen and weaken parts . . . are dangerous, both to the crane and those who work with it.

Now, in the new Whiting Crane, such shocks are effectively cushioned by Fluid Drive, in both bridge and trolley. A fluid coupling between motors and drive mechanisms provides even acceleration and sustained smoothness of operation—regardless of load conditions. This smooth acceleration prevents unsafe swinging of the load. And the crane need not be expensively over-motored to supply a high starting torque. Fluid Drive transmits the full output torque of the motor at all times. Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.

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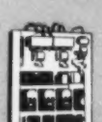
Permits the operator to see in all directions. The comfortable armchair reduces fatigue.

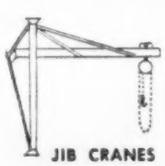


Magnetic Control
This compact, remote control system eliminates drum controls and provides delicate, finger-tip handling of all crane movements.

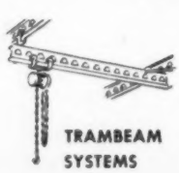
Herringbone Gears
These precision-cut gears provide quieter, more efficient speed reduction; longer life.

WHITING OVERHEAD TRAVELING CRANES

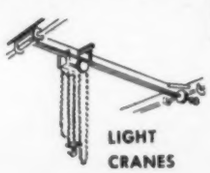
HOISTS



JIB CRANES

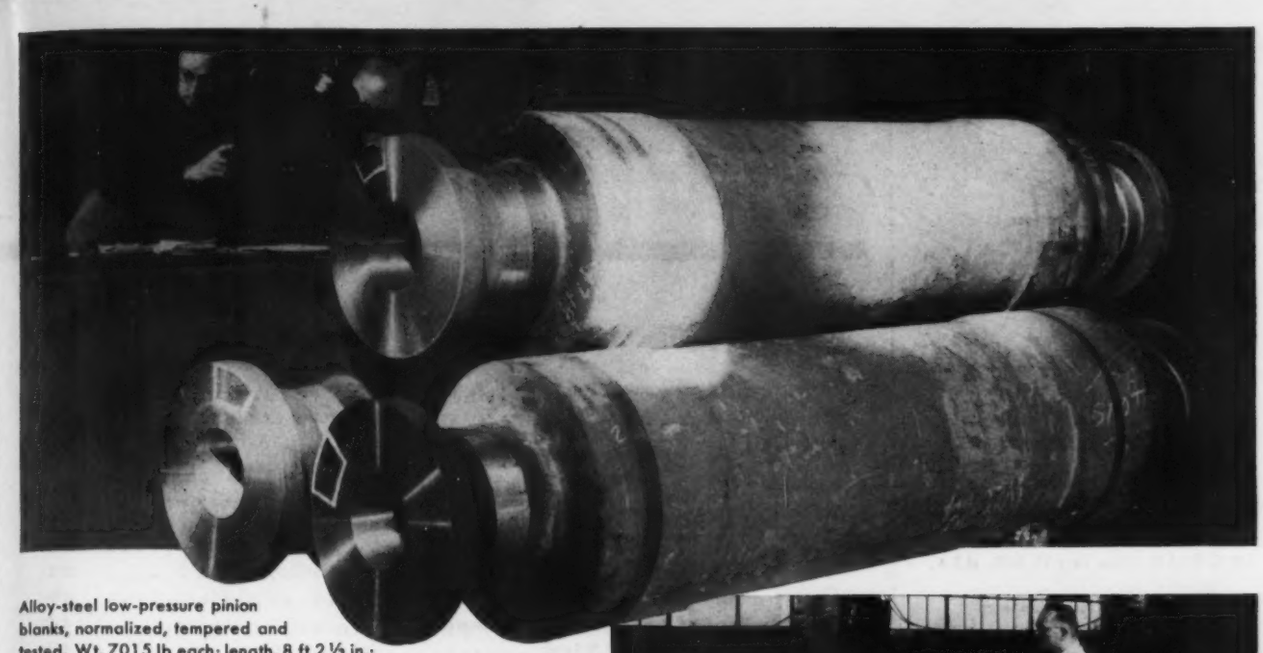


TRAMBEAM SYSTEMS



LIGHT CRANES

Also: Foundry Equipment • Railroad Equipment • Metal-Working Machinery • Swenson Evaporators and Spray Dryers Food Freezers



Alloy-steel low-pressure pinion blanks, normalized, tempered and tested. Wt, 7015 lb each; length, 8 ft 2 ½ in.; main body diam, 20 ½ in.; axial bore diam, 7 in.

Yes indeed!

BETHLEHEM MAKES SMALL FORGINGS, TOO

Bethlehem is so well identified with heavy forgings that people sometimes ask whether we're interested in making the smaller types. Of course we are! Just about any size you need, we can make—and are glad to do it.

Shown on this page are typical Bethlehem forgings in the small- and medium-weight classes. Ask for our bids whenever you have a forging job to be done. You'll find we co-operate.

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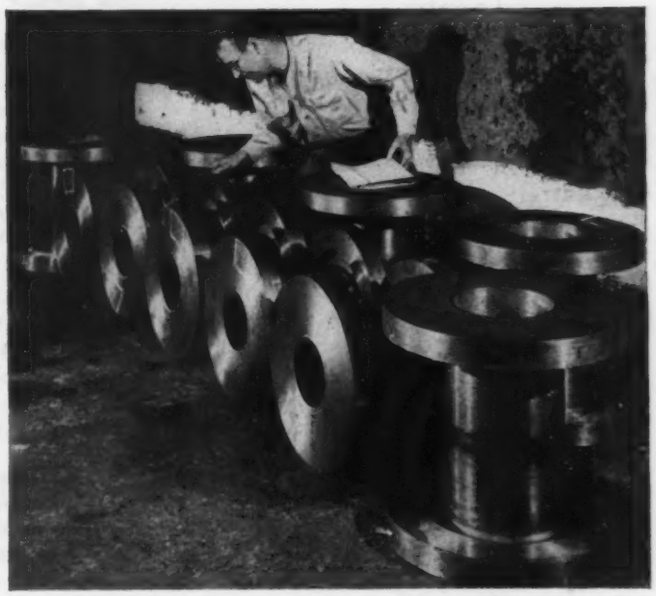
★ BETHLEHEM STEEL ★

Carbon-steel mill spindles, normalized, tempered, tested. For use in hot strip mill. Wt, 4450 lb each; length, 5 ft 5 in.; main body diam, 14 in.; coupling diam, 23 in.



Carbon-steel coupling spacers, normalized, tempered, tested. Wt, 390 lb each; length, 18 ½ in.; flanges, 20 ¾ in.; body diam, 10 ¼ in.; hole diam, 8 ⅜ in.

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JANUARY 19, 1950 • • • VOL. 165, No. 3

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THE IRON AGE

Special Articles

The techniques that should be employed for the successful forging and welding of titanium, as proved through research and development work on ductile titanium conducted at the GE Thomson laboratory, are presented in "Forging and Welding Titanium," starting on p. 63. "Selection of Forging As a Method of Fabrication," p. 70, describes how designers of aircraft must choose between machined, cast, extruded, or forged parts, and weighs forging against these other methods with regard to function, design, and cost considerations.

Issue Highlights

Automotive engineers heard new and practical cost cutting methods described at the 1950 SAE meeting in Detroit. Possibilities for substantial operating economies by increased use of cut wire shot were particularly interesting.—p. 85.

A normal year—neither boom nor bust—is shaping up for producers of commercial steel forgings. Average order backlogs are now about 3 months and 1950 order volume is expected to be within 10 pct of the 1949 total, with dollar volume probably higher.—p. 87.

A relatively new type of construction in this country—using wires in tension to prestress concrete—may become an important factor in steel marketing. For bridge girders, large diameter pipe, tanks, etc., it may mean competition with—or a complement to—reinforcing steel, fabricated plate girders, etc.—p. 90.

The plastics industry, which did seven times as much business last year as it did 10 years ago, is now a billion dollar baby, according to its proponents. Not a competitor, but an industry whose growth can help metals, its production should double within the next 10 years, its market experts predicted at Cleveland conventions last week.—p. 93.

Coming Next Week

Why the steel market in home building remains untapped, along with an analysis of the quantity of steel used in homes, the building boom, and the present steel market, is presented in "Steel and Housing," appearing next week. What this market is, how big it is, and what the prospects for tapping it are, is told in this Special Report to IRON AGE readers.

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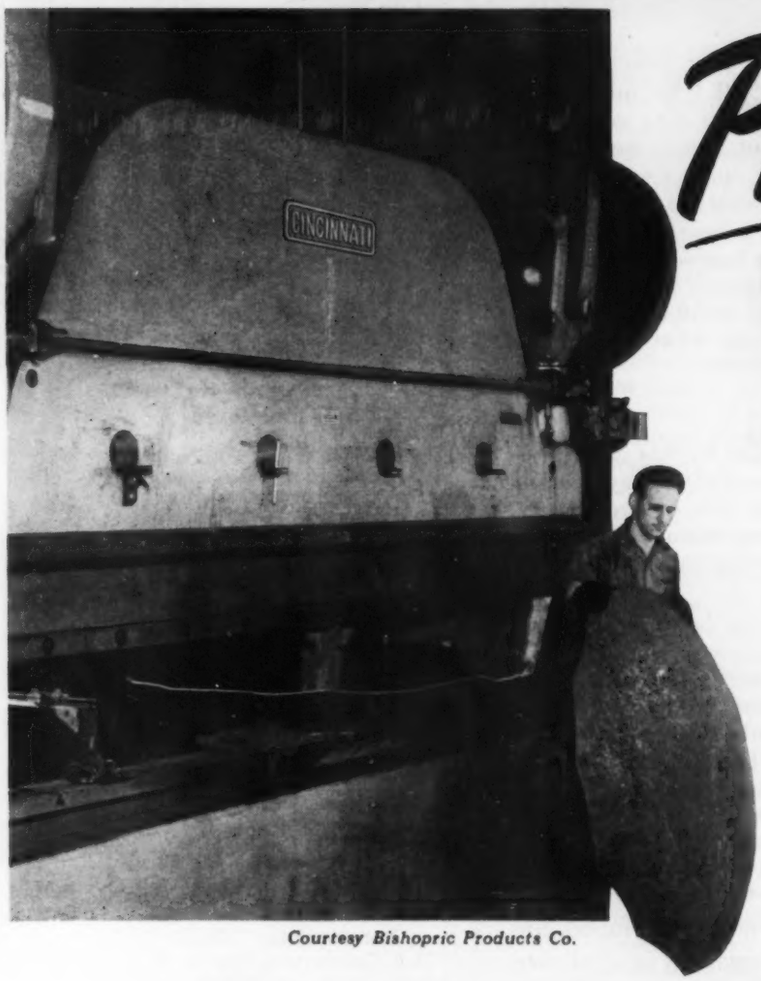
Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $25 per year. Single Copies 35¢. Annual Review Number, $2.00.



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Editorial

INDUSTRY VIEWPOINTS

Pensioners: A Gold Mine

IT is a great idea to give the young ones a chance. To throw them into a new job. And see what they will do. That's the way to build a good force.

It's a great idea, too—and the right one—to have someone coming up for your job. How else can you get a better one.

And there is a lot—yes, a whole lot—to be said for a younger force. A force that has the zip and pep to meet new problems.

But there is another gold mine right in your company. It has been there all the time: The old ones who are not old because no one ever thinks he is old. He may feel it but he doesn't think it. And thinking is what makes experience so valuable.

The arbitrary idea that all people reaching 65 should be pensioned is eye wash. Men reaching that age should be allowed to retire—if they want to. But if they want to work and can do their job it is to the company's advantage to keep them at their job. The valuable and experienced ones especially.

No? You say they should retire if they want to. Sure, that's fine. Yet no? You don't think there is room for them in your plans. Let's take a look at it.

There will be a lot of retirements in the years to come. People's sole interest is often their job. When you take that away they have nothing. If you leave them just a part of it the pickup—and the value to you—is terrific.

Suppose that you have retired some of your key men in sales or production. An emergency arises. You need a lot of expert work done—quickly. You don't know where to turn because the problem is basic. It needs experience. But only temporarily. Why not call in some of your pensioners. Give them the job, pay them for it, and you gain and they gain.

Maybe some of your men should not stay on the job they have at retirement age. With their experience will they fit in education, in research, in library work? Or can you use them in the place everyone is talking about—training? Of course you would have them interviewed and checked by your doctors and personnel people. But it might be worth it. One good man is a gem.

So you have peak periods in the year when you don't want to take men on the payroll and fire them later. That costs money. It is tough on those you hire but it has to be done. Look over your pension list. Are there men there who would be willing to help out for a week, 2 weeks, a month, or more knowing that it is temporary? I'll bet there are. I know some myself.

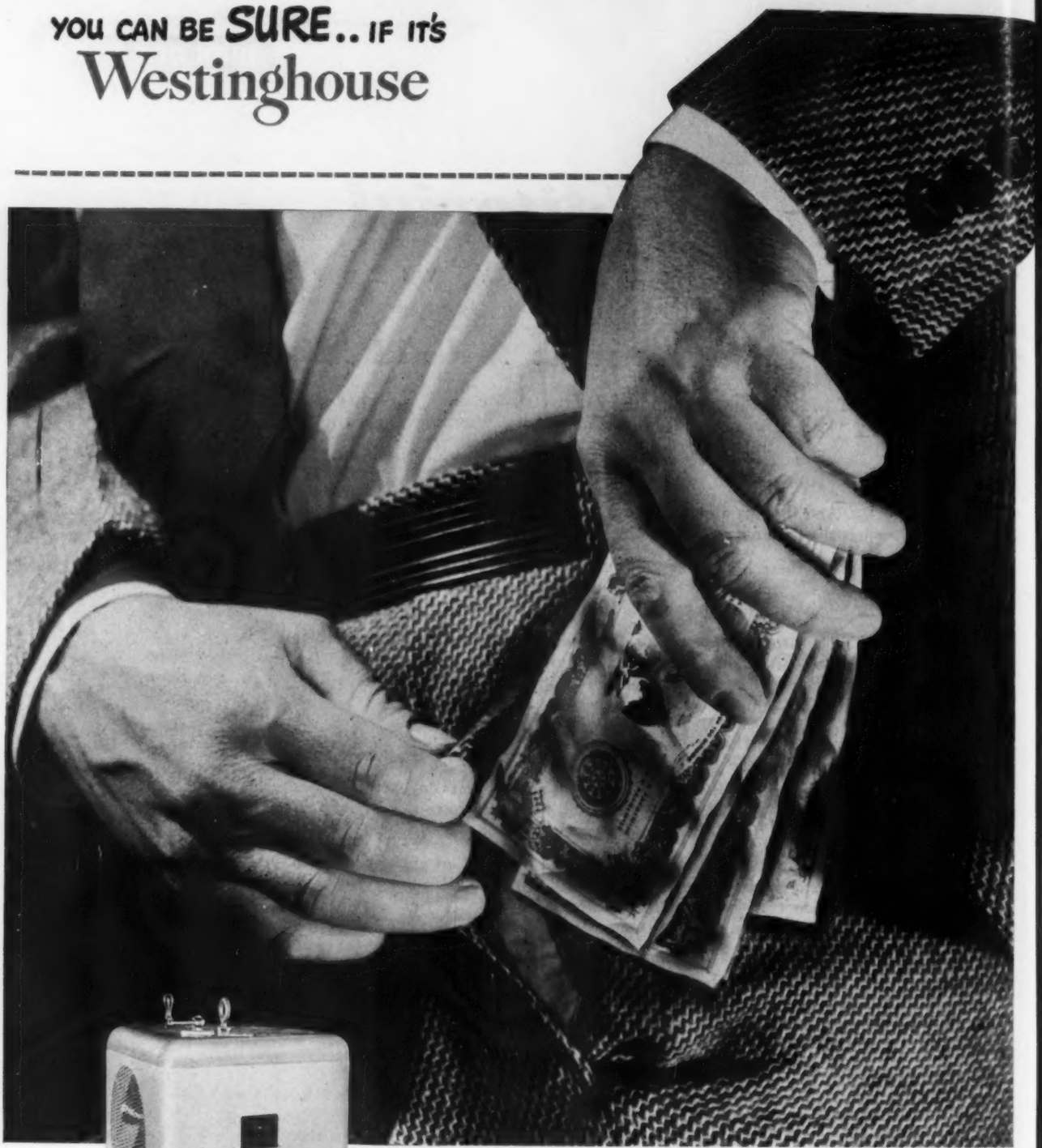
Maybe this is not the complete answer to the problem. But sooner or later government is going to stick its nose in on how the pensioner spends his life and how he lives. Better that industry take a bigger share in this question for the benefit of all concerned. Now is the time to think about it. Remember these elder people were great stuff for you and our government during the war.

Tom C. Campbell

Editor

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



For the first time in D-C welding history, efficiency, no-load losses, and power factor add up to real dollar savings. The NEW WESTINGHOUSE D-C WELDER replaces the bulky, noisy motor-generator with a light-weight, quiet selenium rectifier.

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► Increasing use of stainless steel in architecture is encouraging more fabricators to enter the field. Three manufacturers are going into commercial production of stainless steel storm windows; another is getting ready to make stainless steel storm doors, and still another is considering mass producing stainless hinges, heretofore a custom-built business.

► Metal removal rates of 19 cu in. per min in machining S-816, a high cobalt, high-temperature service alloy, have been accomplished in exhaustive machining tests using hot machining techniques. NACA machining practice recommendations were to grind at a metal removal rate of 2 cu in. per hr.

► Some midwestern steel companies are so concerned over coal that they are buying coke from points as far away as Brooklyn. This, added to unusual costs of buying, storing and handling commercial coal to counter John L. Lewis, boosts steelmaking costs in a way no statistics have shown.

► A new deposit of manganese ore has been discovered in Amapa, Brazil, in the region of the Araguary River. The ore is said to be practically at ground level and distributed over a large area. Preliminary analysis indicates a high Mn content.

► Railroad men are a little more encouraged about getting back some of the steel business they've lost to trucks. Aside from the forthcoming truck rate boost, the railroads plan wider use of special 80,000-lb carload rates, some of which will be below new truck rates and one of which undercuts a once attractive barge haul from Pittsburgh.

► Cost savings up to 60 pct for small gears as low as 1/8 in. PD made by the powder metal process have aroused considerable interest among manufacturers of dial gages, clocks, toys, instruments and business machines.

► The world's largest top charge electric furnace, a 100-ton unit with a 20,000 kva transformer rating is nearing completion and is scheduled for installation in a midwestern steel plant soon. It has a 20-ft shell.

► Inspection expense is one of the more insistent costs of the automobile and appliance industries. In the GM Frigidaire factory at Dayton, Ohio, every tenth person is an inspector responsible for maintaining manufacturing standards.

► A new direct reading extensometer will soon be available which will permit uninterrupted stress strain diagrams. The instrument does not have to be removed during the tensile test as it connects directly to the ends of the specimen and not into a gage marker on the sample or the jaws of the machine.

► A British firm is marketing an ultrasonic soldering iron for use on aluminum and other light metals. The problem of temporarily destroying the refractory oxide film which forms on most light metal and alloys is solved by ultrasonic stimulation.

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3. Tubular Handles
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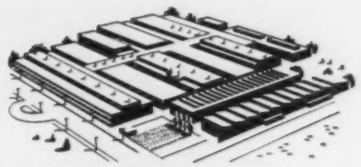
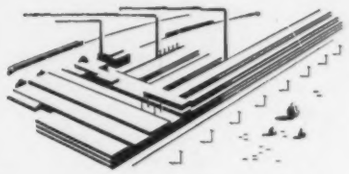


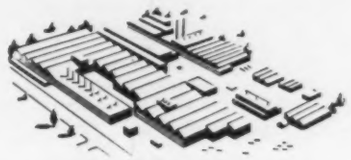
Sand & Permanent Mold Foundries

DETROIT, MICHIGAN



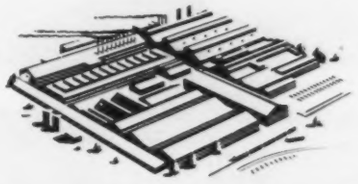
Permanent Mold Foundry

BRIDGEPORT, CONN.



Sand & Permanent Mold Foundries

LOS ANGELES, CALIF.



Sand & Permanent Mold Foundries

ALUMINUM CASTINGS by ALCOA

CESCO's NEW
LIGHTWEIGHT
COVERLITE

WEIGHS LESS THAN 1 OUNCE

Low in cost but high in eye protection

Even this negligible weight (only 97/100 of an ounce) is distributed evenly over the nose, brow and cheeks. No wonder workers wear the new COVERLITE with enthusiasm.

The sturdy injection-moulded, non-flammable frame provides full protection from impact, dust, flying sparks and chips. Good ventilation and ample air space prevent fogging. Large frontal area gives good range of vision in all directions. Easy-to-adjust elastic headband.

COVERLITE goggles can occupy an important place in your safety program. They are ideal for buffing, polishing, light assembly work and spot welding. Choice of clear, light green and dark transparent frames.

the NEW COVERLITE goggle can be worn over most standard types of personal glasses without interference.

For complete information about CESCO'S newest safety goggles ask your CESCO distributor or write...

CHICAGO EYE SHIELD COMPANY
2316 Warren Boulevard • Chicago 12, Illinois
OFFICES IN: Boston, Buffalo, Cincinnati, Cleveland, Columbus, Detroit, East Orange, Houston, Los Angeles, Montreal, Philadelphia, Pittsburgh, Seattle, St. Louis, St. Paul, Toledo, Tulsa

CESCO FOR SAFETY

Fatigue Cracks

By Charles T. Post

Goodbye, Mr. Metallurgist

Sooner or later, we knew these metallurgists would work themselves out of their jobs, and now they've gone and done it. Lindberg Engineering Co., which adds a new type of heat treating furnace to its line every month or so, finally has tired of variety and unveiled a metallurgical robot to end them all.

As introduced to metallurgical gatherings in the Midwest, the robot is under the sponsorship of its inventor, Prof. Ivan Corsetoff. The professor, Lindberg alleges, is a recent refugee from behind the Iron Curtain, where all sorts of things to make your hair stand on end are being invented these days. From his speech you have no doubt that the professor means what he says, although exactly what he says sometimes is not clear. This, of course, is a characteristic of all the most advanced metallurgical theory.

There's no doubt about the robot though. To demonstrate its abilities the professor is armed with an array of metal samples. He merely slips a sample into a slot at the side of the robot, flicks a switch, turns a dial, and the mechanical wonder goes into action. It rolls its eyes, lights blink, and with a rumble the monster booms forth, in accents as clear as borscht, the chemical analysis, grain size, hardness, mechanical properties, and sometimes the winner of the fifth race at Santa Anita. This goes on for quite a spell before temperament begins to tell.

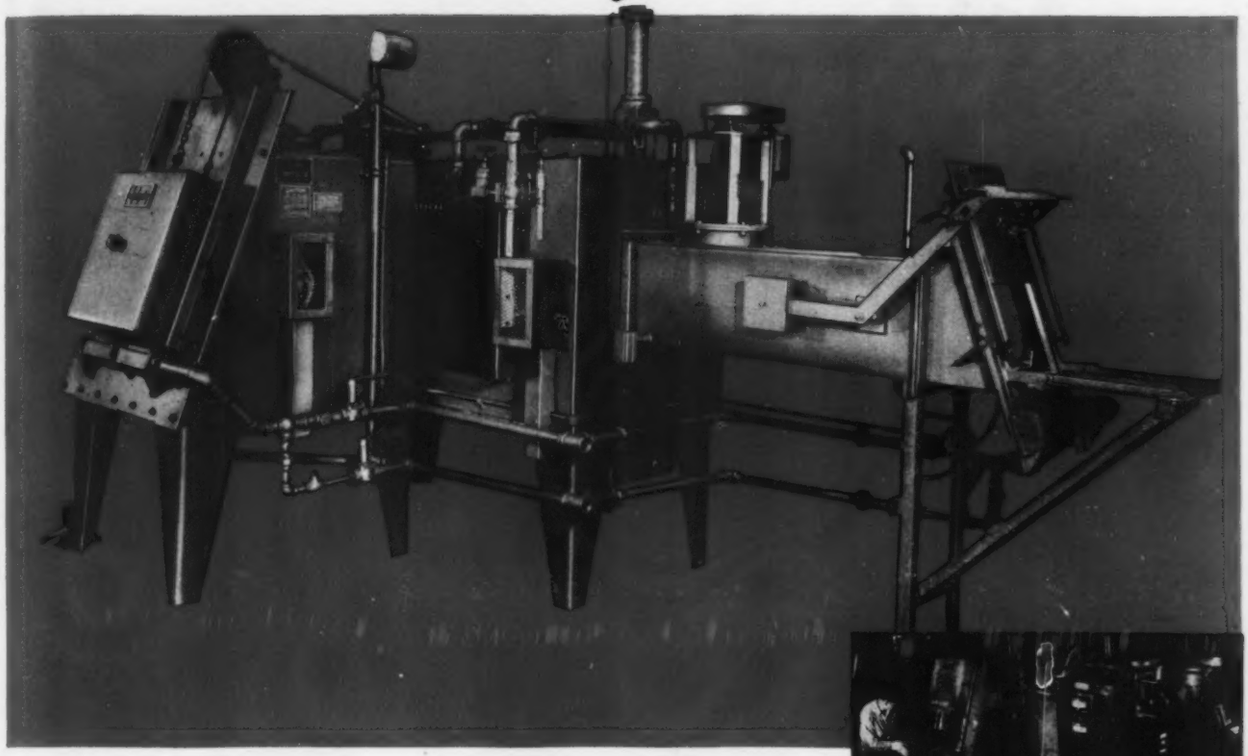
Just like a home-made television set plugged in for the first time, smoke begins to curl from the machine, followed by bright flashes, and explosions, much to the discomfiture of the professor. It's just in the nick of time, for the sake of Lindberg's reputation, that attendants from the mental home arrive to cart the professor away. For that matter, we'll wager that Lindberg's Les Shea had a mental aberration when he thought up the stunt. It's enough to make a metallurgist's blood go cold, though.

Aptronyms

With a new year testing its wings, it is highly appropriate that we submit to the electorate a new

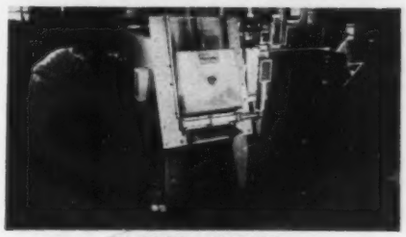
Turn to Page 124

Announcing a new process for heat treating High-Speed Steels!



LOS ANGELES, CALIFORNIA

ST. LOUIS, MISSOURI



CHICAGO, ILLINOIS

THE LINDBERG "L-TYPE" FURNACE

This revolutionary new furnace is designed to harden precision high-speed tools completely scale free and without discoloration. It is ideal for tools with fine cutting edges that cannot be ground or cleaned after hardening.

Unique in construction and appearance—preheat, high heat and quench are combined in one unit—designed for complete atmosphere protection from start to finish. The "L-Type" Furnace is the result of three years of research and a year and a half of testing in the Lindberg Commercial Heat Treating Plants. It is the FIRST MAJOR ADVANCE in hardening high-speed steels since the introduction of atmosphere treating.

COMPLETELY ELIMINATES

- . . . cracking of tools due to quenching strains
- . . . removing scale by sandblasting or grinding
- . . . drastic dimensional changes during processing
- . . . oil quench tank and oil cooling system
- . . . washing quench oil from work
- . . . decarburization and carburization troubles

OFFERS MANY ADVANTAGES

Improved surface appearance... Increased tool life... Decreased heating costs... Decreased atmosphere costs... Improved working conditions... Not limited to high speed steels.

Write for Bulletin No. 220 for full details.

LINDBERG ENGINEERING COMPANY 2452 W. Hubbard Street, Chicago 12, Illinois

LINDBERG FURNACES

Iron Age *Introduces*

STEPHEN M. JENKS, vice-president in charge of operations, Carnegie-Illinois Steel Corp.

WILLIAM C. OBERG, general manager of operations, Carnegie-Illinois Steel Corp.

SAMUEL McCLEMENTS, JR., manager of sales, Carnegie-Illinois Steel Corp.

George L. Irvine has been appointed manager of the newly-organized Agency and Distributor Div. of GENERAL ELECTRIC CO., Schenectady, N. Y., and **R. D. Moore** will be assistant manager. Mr. Irvine joined GE in 1930 as a student engineer on the Test Course, and has held various positions prior to his recent appointment.

Charles J. Davitt has been appointed director of traffic of the BUDD CO., succeeding **Clarence H. Rolf** who is retiring after nearly 33 years as head of the traffic department. Mr. Davitt has been associated with Budd since 1918.

Charles H. Glasier, Jr., has been elected manager of distribution for AIR REDUCTION SALES CO., New York. Mr. Glasier joined Air Reduction in 1936.

Stephen M. Jenks has been elected vice-president in charge of operations of the CARNEGIE-ILLINOIS STEEL CORP., Pittsburgh, succeeding **James E. Lose,** who was recently elected executive vice-president. **William C. Oberg** has been appointed general manager of operations. He had been manager of operations in the Pittsburgh district. **Samuel McClements, Jr.,** was named manager of sales for the railroad materials and commercial forgings division. **F. Royal Gammon** was appointed manager of sales, eastern area, succeeding the late **Philip M. Guba.** He was formerly New York district manager of sales.

Walter F. Munford has been elected vice-president in charge of operations of AMERICAN STEEL & WIRE CO., Cleveland. Mr. Munford started with the company as a die-reamer 30 years ago.

J. J. Davis, Jr., manager of sales, railroad division, INLAND STEEL Co., has also assumed responsibility for pig iron and chemical sales. **A. C. Engh** has been appointed manager of the pig iron and chemical section of the consolidated sales units.

John McVeigh has been named special development engineer of KENNAMETAL INC., Latrobe, Pa. Immediately prior to becoming associated with Kennametal Inc., he was employed by Continental Motors Corp., Detroit.

Cleveland Lane was named manager of the Public Relations Div. of the PENNSYLVANIA SALT MANUFACTURING CO., Philadelphia. Mr. Lane, previously served as Pennsalt account executive with Geare-Marston's Public Relations Dept.

A. E. CONN, general purchasing agent, Ford Div., Ford Motor Co.

A. E. Conn has been appointed general purchasing agent and **M. W. Welty** industrial relations manager for the Ford Div., FORD MOTOR CO., Dearborn. Mr. Conn has been with the Ford organization for the past 30 years and in purchasing work since 1925. Mr. Welty has been manager of industrial relations planning and analysis department of Ford.

F. C. Norris has been promoted to vice-president and general manager of the DENISON ENGINEERING CO., Columbus, Ohio, and **C. A. Hughes**, formerly plant superintendent, has been named vice-president and general works manager.

H. L. Schultz has been named district manager of WYCKOFF STEEL CO., Pittsburgh. Mr.Schultz succeeds **Edwin L. Wolf** who has retired.

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Iron Age Salutes

SAM HEPPENSTALL

SAMUEL B. HEPPENSTALL, Sr., chairman of the board of directors of Heppenstall Co., Pittsburgh, retired this week after 51 years of employment with the firm. But there's much more to the story than that.

In the first place he is known to a lot of people as just plain "Sam." To those who know him well, Sam is essentially a meticulous craftsman. One who achieved marked success over seemingly overwhelming physical obstacles.

These physical obstacles were severe enough to have discouraged a less stout-hearted person. While still a young boy he lost the sight of one eye, a fact still known to only a few people. During his late teens an illness left him with seriously impaired hearing. After that he gradually became deaf.

Undaunted, he learned to read lips. He forsook the banquet circle and applied himself to his work. He became a thinker and a planner. And he backed it up with hard work.

During his 51-year span of achievement, he has been a draftsman, an apprentice machinist, a machinist, an engineer and an executive. The same qualities of careful attention to detail, perseverance and pride of workmanship carried him to the top in each job.

Even when he reached the highest position in his firm Sam never lost his love for engineering. Because of this he contributed greatly to machinery and plant improvement in the Heppenstall Co. There are still a number of drawings in the engineering department which bear the initials "S.B.H."

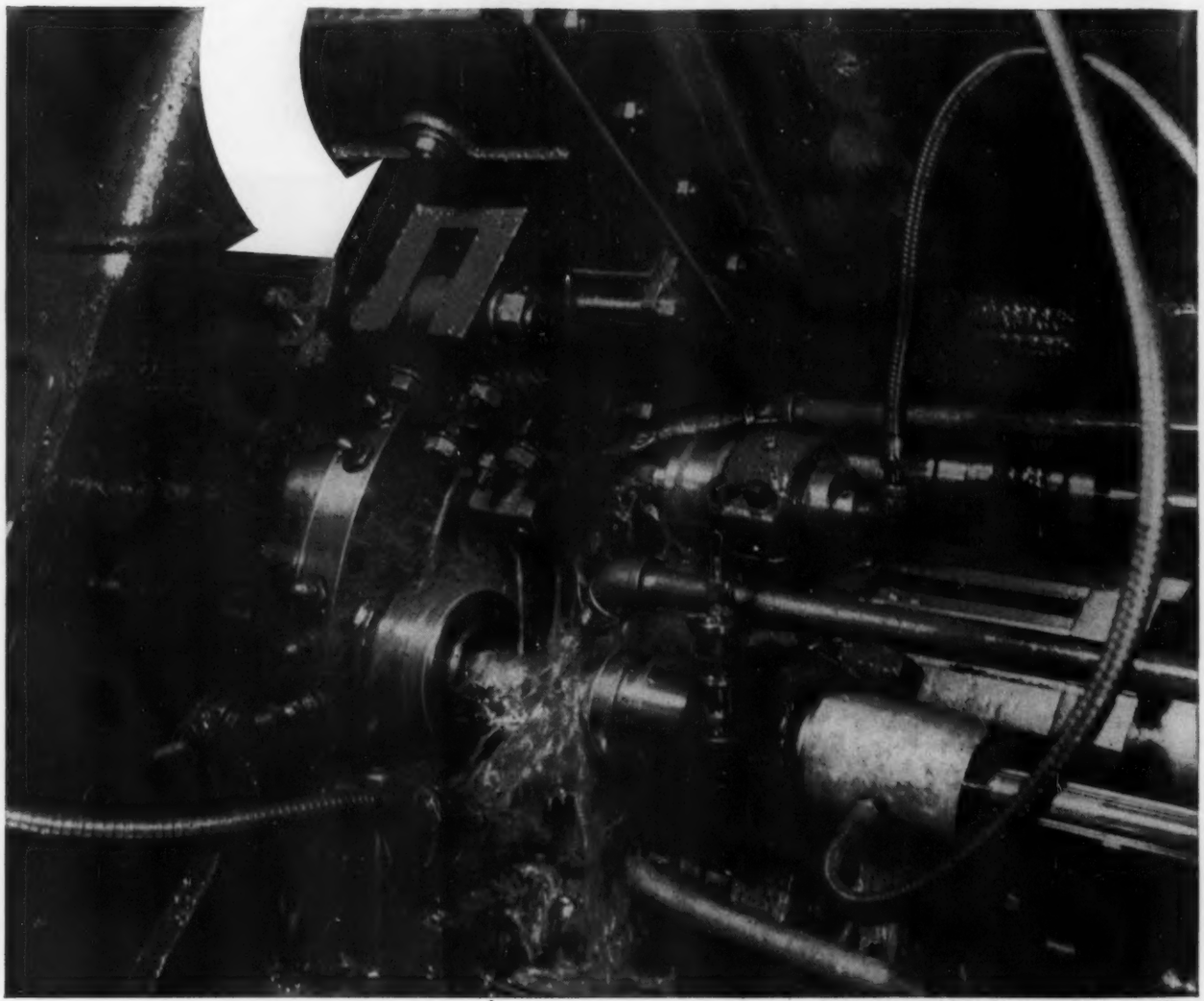
Today, he still likes to tinker with automobile engines and household repairs. He likes to make sure his watch is highly accurate and all clocks are running just right.

Sam came into his father's business as a draftsman in 1897. After a short time he left the company to become an apprentice machinist at Westinghouse Electric & Mfg. Co. Two years later he rejoined his father and since that time consistently rose through the ranks to the board chairmanship.

He was rewarded for his tireless devotion to engineering activities in 1917 when he was named vice-president in charge of engineering. This move proved a wise one for the firm. His ingenuity in designing and improving mechanical equipment is still paying dividends to the firm.

Upon leaving active participation in Heppenstall Co. affairs, Sam turns over added leadership responsibilities to the fifth generation of the famous steel family. His son, Max R. Heppenstall is chief engineer; nephew, R. B. Heppenstall is president and another nephew, C. W. Heppenstall is vice-president in charge of operations.

HERE is



Cover has been removed from this automatic screw machine.

HERE'S A NEW STEEL THAT MACHINES EVEN FASTER THAN UNION SUPERCUT (B-1113)

... it may save you money!

If you're familiar with Union Supercut, you probably know that for many years this *original* high-sulphur steel was the fastest-machining Bessemer available. Today, however, there is some demand for even higher machinability —*for which Union Drawn has developed a new Bessemer steel* (B-1113-X). If your products and equipment are such that higher speeds and even longer tool life are practical, production-wise and cost-wise, a Union Drawn Field Service Man will be glad to discuss its possibilities.

SPEED PRODUCTION, IMPROVE QUALITY

wire-cable greases. Recommended for power presses, mining machinery, worn reduction mills, crushers, pump gears, etc.

SUNOCO TRACTOR ROLLER COMPOUND—For crawler-type tractors. Provides good lubrication with exceptional sealing qualities.

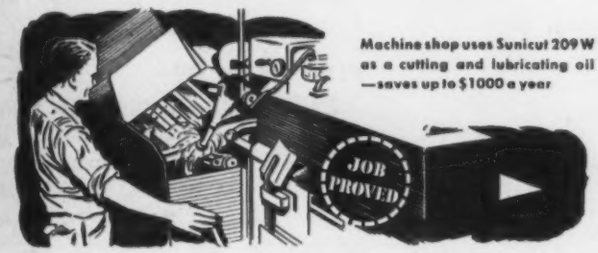
METALWORKING OILS

SUNICUT—Straight (non-emulsifiable) transparent cutting oils. Recommended for automatic screw machines and heavy-duty machining operations. Permit high speed production with excellent finishes, long tool life.

SUNOCO EMULSIFYING CUTTING OIL—A self-emulsifying oil which produces a stable white emulsion. Efficient and economical cooling and lubricating medium for turning, milling, drilling, and other metalworking operations on both ferrous and nonferrous metals. It is also an excellent grinding coolant.

SUN QUENCHING OILS—Specially refined oils designed to aid development of maximum physical properties in a wide variety of steels.

SUN TEMPERING OILS—Specially refined oils for tempering steel. Because of their low carbon content and stability under heat, these oils have an unusually long service life.



Machine shop uses Sunicut 209 W as a cutting and lubricating oil —saves up to $1000 a year

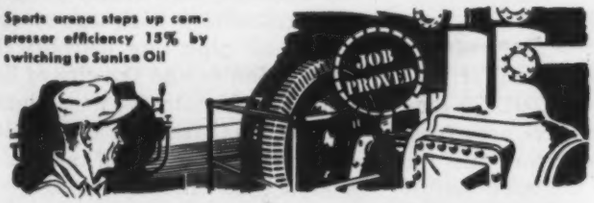
SUN ROLLING OILS—Straight and emulsifying oils which will permit maximum production in rolling steel, aluminum, brass, and copper.

SUN ANTI-RUST COMPOUNDS—Petroleum-base oils with chemical additives designed to prevent the rusting and corrosion of steel.

REFRIGERATION OILS

SUNISO REFRIGERATION OILS—Have extremely low pour points, extremely low wax-separating characteristics, a high degree of stability and long life. Initially neutral and resistant to formation of detrimental acids under service conditions. Suniso Oils are high quality oils suitable for both high- and low-temperature operations. The most widely used oils in refrigeration and air-conditioning.

Sports arena steps up compressor efficiency 15% by switching to Suniso Oil



TEXTILE-PROCESSING OILS

SUNOTEX TEXTILE OILS—Designed to impart certain additional properties to various forms of fibers during their processing from the fiber state into a manufactured product. All Sunotex textile oils are emulsifiable in water. Highest rating in fadometer tests.

SUN COTTON CONDITIONING OILS—Pale mineral oils which condition the cotton. They prevent waste by cutting down excessive amounts of "fly" (fine air-borne lint particles).

Worsted mill obtains easier scouring, better quality, larger yield with Sunotex WO-220

SUN ASBESTOS FIBER CONDITIONING OIL—Used for spraying on the asbestos during processing. Fibers are kept from being damaged or broken down, and harmful dust is minimized when this product is used.

SUN CORDAGE OILS—Generally used alone, but are adaptable to various formulas used by cordage manufacturers. Selected products, highly compatible with additives.

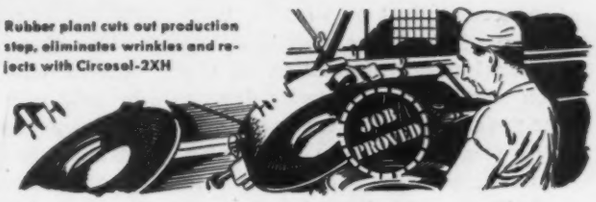
RUBBER-PROCESSING AIDS

CIRCOSOL-2XH—An elasticator and processing aid for natural rubber and especially for GR-S. Outstanding for sponge rubber.

CIRCO LIGHT PROCESS AID—A processing agent and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber. Used for GR-S to some extent.

SUNDEX-53—An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established processing aid for rubber footwear stocks and semihard rubbers.

Rubber plant cuts out production step, eliminates wrinkles and rejects with Circosol-2XH



CIRCOMAR-5AA—A black-colored product for processing natural and GR-S rubber used in tire-making. Also used in reclaiming natural-rubber scrap. Replaces asphalt fluxes. Free-flowing at room temperature.

WAXES

Sun's new wax plant was completed in 1949. Its many refining innovations and extreme flexibility permit new types of waxes to be manufactured in large quantities—a procedure heretofore impracticable. A wide range of fully refined paraffin and microcrystalline waxes will be "tailor-made" to meet the requirements of virtually all major industrial applications. Pilot plant samples of several grades are now available.

MISCELLANEOUS INDUSTRIAL PRODUCTS

SUN SOLVENTS—Sun Spirits for the thinning of paints, varnishes, and enamels, and for metal-cleaning . . . a pure, water-white petroleum solvent free of corrosive sulphur. Other Sun solvents with special properties are available for the chemical industry.

SUN LEATHER OILS—Mineral-base leather oils. Used for obtaining the desired tensile strength, proper temper, and controlled moisture content. Maintain a light even color . . . mix well . . . distribute evenly.

"JOB PROVED" IN EVERY INDUSTRY

PRODUCTS SUNOCO

GLOBAL LETTER

REVIEW OF WORLD MARKETS

Brazil's steel industry continues to modernize and expand ... List of finished products broadening rapidly ... Record tonnage of ore moved ... Oil industry is growing.

San Paulo—Volta Redonda has produced 48 pct of Brazil's total output of steel this year. But the national mill's production of pig iron was interrupted twice during the year. The furnace was stopped for relining in March and April, although it had been in service only 3 years. Another stoppage occurred in October to repair defects.

In November production of rolled products at Volta Redonda reached 24,000 tons, compared with a monthly average of 16,000 tons in 1948.

Two additional Martin furnaces are to be installed. They will be of 180-ton load capacity. The foundry for making cylinders and heavy pieces up to 120 tons of cast iron and steel is about to begin operating.

Other Companies Expand

The Companhia Belgo-Mineira has completed its fourth blast furnace for 90 tons of pig iron per day, and its fourth 40-ton steel furnace. Provision has been made for one more of each. Three Pitts furnaces, with capacity for 40 tons of ingots each, are heated by gas from the blast furnace. This company's installations include modern rolling mill, wire drawing and galvanizing plant.

The Companhia Acos Especiais Itabira will be in full operation in 1950. It will manufacture fine steels, using 20 and 5-ton electric furnaces, a frequency furnace of ½ ton load and a 10-ton Bessemer converter. Production will include agricultural implements, finished rolled products, special steel plate and drawn wire. The reheating furnaces will burn gas from the blast furnace combined with powdered charcoal.

Carries Record Ore Tonnage

During 1949 the Central of Brazil Railway carried 1,001,579 tons of iron and manganese ores from Minas Geraes for export and for consumption by national mills. This exceeds even the record amounts carried during the war years. A special commission was recently appointed by the railway to direct and intensify the transport of ores.

The Minas Geraes mills, however, are complaining that, owing to the high freight rates on semi-manufactured products in relation to those on ores, they are unable to compete with manufacturers in Rio de Janeiro and San Paulo. The Minas Geraes blast furnaces, output of which is almost entirely consumed outside the state, are now accumulating big stocks.

Progress In Oil

By the end of 1949, 10 years after the discovery of flowing oil in Brazil, the situation was as follows: (1) At least 164 wells, including 62 dry holes, had been opened in the State of Bahia, where an improvised refinery was operating. (2) Work was started on Brazil's first modern topping and cracking unit to process 5000 bbl of national crude. (3) Arrangements were concluded for installation of three other plants to refine 25,000, 20,000 and 10,000 bbl of imported oil. Two of these are to be installed at San Paulo and the other in the Federal District. (4) Preliminary work was started on an oil pipe line between the port of Santos and the city of San Paulo. And contracts were signed for the purchase by the Brazilian government of a fleet of tank ships with a total carrying capacity of 205,000 tons.

Progress in developing Brazil's oil industry was slow prior to 1946. Imports of essential materials had to be suspended throughout the war years. The nationalist legislation still in force precludes participation of foreign capital in the industry. But a revised law is now before Congress for discussion. Drilling will start early in 1950 in two recently selected areas in the Far-north.

Research Laboratory of S. C. Johnson & Son, Inc., with tubular-glass-walled wax research tower now under construction. Frank Lloyd Wright, Architect. Samuel R. Lewis, Consulting Engr.

Air OF RESEARCH

RESEARCH: "Critical and exhaustive investigation having for its aim the discovery of new facts and their correct interpretation . . ."—*Webster.*

THE constant search for ways to develop and improve products is one of many ways in which "Buffalo" Fans team up with industry! An "experiment in behalf of the American housewife", the famous new Johnson wax research tower will enjoy air completely free of dirt and dust—a "must" for Johnson standards of product purity.

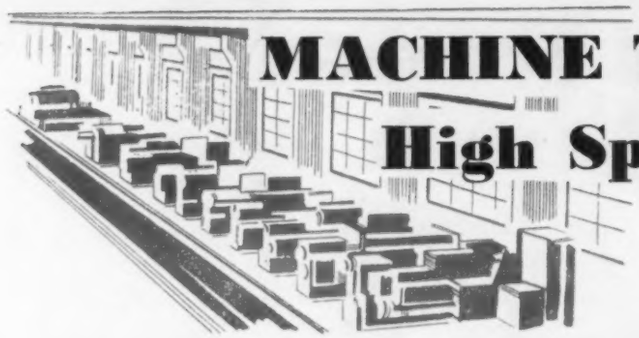
Hundreds of leaders like S. C. Johnson & Son have picked "Buffalo" fans to help make a better product. And many more firms are using these efficient, quiet-running fans on scores of other profitable uses—for comfort, for safety, for product and process control—for *better productivity and increased profits!*

Why not put the air in *your* plant to full use? Your nearby "Buffalo" engineering representative will give you all the facts. Call him, at no obligation.

"Buffalo" Belted Vents provide compact units for industrial and commercial ventilation

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY
492 BROADWAY BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Branch Offices in all Principal Cities



MACHINE TOOL High Spots

Sales Inquiries and Production

Lists potential markets for U. S. machine tools in ECA countries . . . Business uptrend continues . . . Detroit suppliers slow.

by William A. Lloyd

Cleveland—Big news for machine tool builders broke late last week when ECA released, in Washington, a list of machine tools for which there are potential markets in ECA countries.

The information is the first commodity analysis to be obtained and provides American small business firms with useful data on sales possibilities abroad under the European Recovery Plan.

ECA points out that types of machine tools listed are those presently manufactured in the U. S. and for which there is no substitute equipment produced in Europe. When purchases are made, ECA emphasized, the orders will have to be placed with U. S. suppliers.

Quotations Being Requested

Although it has no knowledge of requests for quotations being made by European importers, ECA said it is informed that the machine tools can be utilized by industries overseas.

Unlike information already released by the Office of Small Business, on purchases to be made from U. S. exporters, the machine tool list does not represent, necessarily, overseas buyers' current requirements.

Small business firms manufacturing equipment equal to any of the types included in the list may desire to explore the market potential for their products, ECA stated. A majority of sales prospects would appear to be in England and Scotland, according to ECA, although the list is an assessment of probable needs for machine tools for all participating countries.

Machine Tools Listed

The list includes automatic lathes, jig borers, milling machines, boring machines, gear cutting machines, and shapers, grinders, lapping and honing equipment, presses and threading machines.

Release of the list created a happy furor in some segments of the industry, but the fact remains that the foreign dealers and representatives have to sell the machines. The information is helpful and constructive, and the need is there, but the dollars are still a factor.

Expects Greater Production

In New York, the Machinery and Transportation Equipment Div. of the Dept. of Commerce predicted that it was "reasonable to expect production of machine tools to turn upward in 1950, with the annual output reaching $300 million compared to a 1949 value of $248 million."

This prediction follows rather closely the off-the-cuff statements of some machine tool builders who felt, as early as mid-December 1949, that the industry was due for a better year in 1950.

Preliminary reports of December orders and shipments indicate a continuation of the uptrend. New firm orders are expected to be up about 10 pct in the aggregate, with foreign orders showing a substantial increase and domestic orders a drop, compared to November business. Shipments are expected to show about a 10 pct increase over November, and with order volume exceeding shipments, the backlog of unfilled orders is also expected to register an increase. However, substantial foreign cancellations in December have been reported in the "trade."

Business Appears Spotty

Business is spotty in both foreign and domestic markets. First inquiries out of Japan since before the war are being received by some segments of the industry.

On the other hand, bulk of the foreign business for most segments of the industry came from Europe in 1949. South America proved to be something of a bubble that broke on exploration, according to trade sources, and it is unlikely that much effort will be expended in that direction by most companies in the foreign markets in 1950.

Expecting New Business

In Detroit, machine tool suppliers are momentarily expecting placements from Chrysler-Jefferson on a new high compression V-8 engine. There has also been some recent activity at Lynch Rd. axle plant, according to trade sources.

Meanwhile, placements for the new Ford transmission plant at Cincinnati are continuing.

There have been some recent inquiries from the General Motors transmission division, but generally speaking, the corporation is quiet at the moment.

Tool and die activity here is at a low level and there is considerable pessimism in tool and die circles over the prospects for the next few months.

This is another of the "HUNDREDS OF JOBS" which can be done only on a MARVEL Band Saw!

MARVEL BAND SAW saved these two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the 1½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model #8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL, B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

WRITE FOR CATALOG

These exclusive MARVEL Features made this job easy!

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic blade tension.
5. Built-in coolant system.
6. Large capacity.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

See our CATALOG in SWEET'S FILE

FREE — USE POST CARD

PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Insulated Transformers

The line of NWL auto and insulated transformers from 0.001 to 300 kva, 20 to 400 cycles (including open frame and cased types), is presented in 8-p. photo-illustrated catalog. *Nothelfer Winding Laboratories. For more information, check No. 1 on the postcard.*

Switchgear Equipment

Automatic sectionalizing units for inside-of-mine applications are described and illustrated in "Switchgear for Mines," an 8-p. bulletin. *General Electric. For more information, check No. 2 on the postcard.*

Wirebound Boxes

The line of Superstrong wirebound shipping boxes and crates, pallets, corrugated boxes, beverage cases and starch trays are listed and described in illustrated pamphlet. *Rathborne, Hair & Ridgway Co. For more information, check No. 3 on the postcard.*

Foundry Loader

The handling of sand, slag, sprues and other foundry materials through use of the Foundry Payloader is illustrated and described in 4-p. catalog. *Frank G. Hough Co. For more information, check No. 4 on the postcard.*

Sectional Scaffolds

Various arrangements of Trouble Saver prefabricated steel sections for use as movable scaffolds in repairing, painting, decorating, plastering and other maintenance work are described and illustrated in 4-p. bulletin. *Patent Scaffolding Co. For more information, check No. 5 on the postcard.*

Locking Devices

Locking, catching and swinging devices for use in the manufacture of metal cabinets and lockers, metal doors, dairy equipment, switch boxes, aircraft, medicine cabinets, blanket warmers, narcotic compartments and other items are contained in 50-p. catalog. *P. & F. Corbin Div., American Hardware Corp. For more information, check No. 6 on the postcard.*

Clutch Coupling

The Rawson clutch coupling with taper bushings that will accommodate any shaft from ¾ to 1¾-in. diam, in 1/16 in. increments, with standard keys, is described and illustrated in specification sheet. *Centric Clutch Co. For more information, check No. 7 on the postcard.*

Punch Presses

Large bolster area double-crank punch presses of 30-ton capacity and 80 stroke per min speed, in the Diamond Multi-Max line, are presented in 8-p. catalog featuring photos, text and specification charts. *Diamond Machine Tool Co. For more information, check No. 8 on the postcard.*

Displacement Meters

The line of Roots-Connersville displacement meters used to measure natural gas, purified and unpurified manufactured coal and water gas, air, hydrogen, oxygen, acetylene, methane, carbon dioxide, blast furnace gas and other types of gases are described in 16-p. bulletin through use of photos, detail drawings and text. *Roots-Connersville Blower Corp. For more information, check No. 9 on the postcard.*

Lathes

The Springfield line of lathes is described through photos, text and specification charts in 4-p. catalog. *Springfield Machine Tool Co. For more information, check No. 10 on the postcard.*

Water-Cooled Burners

How steam and fuel are proportioned by the Crowe Artillery water-cooled burners to give combustion and fuel economy and decrease the

Turn to Page 119

FOR DEPENDABLE LONG LIFE

insist on

Nickel Alloy Steel Gears

There are two kinds of nickel alloy steel gears . . . those that are carburized, and those that are direct hardened.

CARBURIZED GEARS

The carburized gear is used in applications that require maximum wear resistance in the surface, as well as greatest surface compressive strength. With nickel alloy carburizing steels, this goal is consistently attained, together with development of extremely tough cores that resist shock loads, fatigue and bending stresses. Moreover, a chief cause of noisy gears . . . the distortion that accompanies heat treating . . . is inherently resisted by nickel alloy carburizing steels.

DIRECT HARDENED GEARS

The direct hardened steel gear is used to carry heavy tooth loading in applications where resistance to wear and surface compressive stresses is not quite so vital a factor. Here again, the nickel-containing steels develop the required strength more consistently and in heavier sections than carbon steels, and are generally more resistant to shock, fatigue and multi-axial stresses. Distortion resulting from heat treatment may be minimized by using nickel alloy steels and their machinability before final heat treatment is very good.

Giving greater play to the skill of the engineer, nickel alloyed steels not only provide increased strength without sacrificing ductility, but they harden at lower temperatures which simplifies heat treatment and minimizes deformation and scaling.

MEET VARIED REQUIREMENTS

Nickel alloyed steels enable producers to meet virtually any reasonable requirements . . . whether dictated by revised stress analysis due to design changes, or by changed fabricating methods that demand better machining qualities or improved response to heat treatment.

MANY TYPES AVAILABLE

The many standard grades of nickel alloyed steels permit specifying the particular type which provides the best set of properties for any reasonable fabrication and service demands.

Unending competition for higher speeds and heavier loads, for quieter operating and longer machine life, provide opportunities for gear producers to drive ahead with nickel alloyed steels. Use the coupon for your copy of "Modern Trends in Nickel Steel and Cast Iron Gear Materials." This useful and informative booklet is yours for the asking. Send for it now.

MAIL COUPON FOR VALUABLE BOOK

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Dept. I.A., 67 Wall St., New York 5, N. Y.

Please send me a copy of:
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*Name*_____ *Title*_____

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EMBLEM OF INCO SERVICE TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

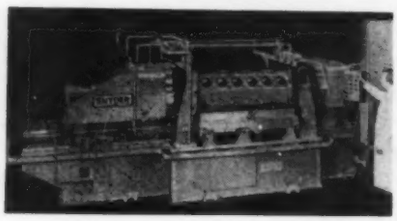
NEW PRODUCTION IDEAS

Continued

is controlled by an adjustment knob on the outside of the thermostat housing. *Edwin L. Wiegand Co. For more information, check No.* 22 *on the postcard.*

Indexing Machine

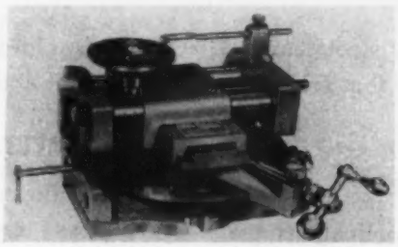
A two-way horizontal indexing machine has been built to permit greater accuracy in drilling, reaming and tapping holes in a large aluminum alloy crankcase. The machine is equipped with two Snyder standard hydraulic slide units that carry the multiple spindle heads for drilling and other operations. Two



standard lead screw tapping units are mounted at the rear of the machine. The tapping unit for the flywheel end of the part has 25 lead screw spindles. An 11 lead screw spindle head is required for the opposite end. High speed steel tools are used and the operation of drilling, reaming and tapping a total of 53 holes takes three minutes, plus loading and unloading time. *Snyder Tool & Engineering Co. For more information, check No.* 23 *on the postcard on p.* 35.

Cam Cutting Machine

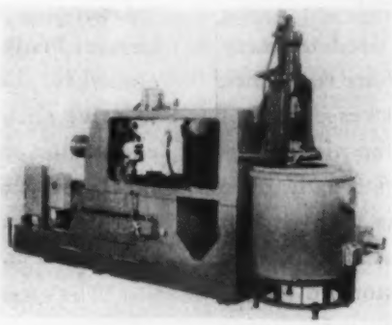
Mathematically perfect cams are said to be produced without layout by the new Helix-Master cam cutting machine, that introduces two important improvements in cam making. Through the geometric action of three compounded slides it assures lobes with a consistent rise through every 1/100 segment —not fast or slow intervals. The surface profile is generated in one continuous, sweeping motion. It will produce a perfect cam directly from engineering computations without any drawings, templates or preliminary layout. A blank stamped in 1/100ths is equally unnecessary as these calibrations are embodied in the machine itself. The Helix-Master is entirely self-contained and may be mounted on any suitable machine tool such as milling machine, grinder or drill



press. Mounting is as simple as a vise or other fixture. *Sheffer Collet Co. For more information, check No.* 24 *on the postcard on p.* 35.

Diecasting Machine

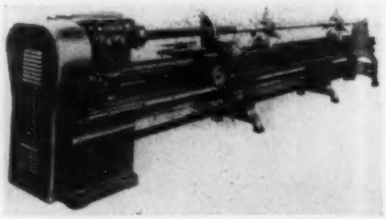
A submerged plunger injection system features the new Hp-1-Z zinc diecasting machine. It is designed to eliminate as far as possible, the human element in setting up and adjusting the machine. The



gooseneck locates itself in two machined slots in the yoke. Misalignment is impossible. The only adjustment is with two dog point screws against the bracket, seating the gooseneck firmly against the nozzle. The pot can be made any size, since it is entirely separate from the machine itself. Oil lines to and from the plunger cylinder are permanent, rigid pipe lines. Control on die movement cycle and on metal injection cycle is by two special electric timers. *Lester-Phoenix, Inc. For more information, check No.* 25 *on the postcard on p.* 35.

Long Bed Lathes

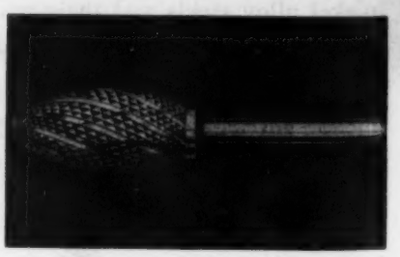
Designed to handle a full range of work, including long, lightweight pieces ordinarily machined on expensive, heavy-duty lathes, the Se-



bastian 20-in. geared head lathes are now being produced in extra long bed lengths of up to 20 ft. These lathes are general purpose and gap types, and are equipped with 8-speed geared heads having Timken tapered bearings on all headstock shafts, and Timken precision bearings on spindles. Other features include reverse speed control in apron, knob control handle for apron-length feed friction, 54 feed and thread changes, and accuracy of 0.0005 in. at every point of alignment. *King Machine Tool Div., American Steel Foundries. For more information, check No.* 26 *on the postcard on p.* 35.

Carbide Burs

Designed for the efficient removal of excess metal when shaping and finishing all kinds of materials, particularly steels used in producing dies and molds, a new carbide bur is claimed to provide better operator control, especially in nose-cutting. The relatively new diamond-cut design of Pratt & Whitney Keller carbide burs has been further improved by deepening the flutes at specified intervals. P & W Di-Burs are master ground from

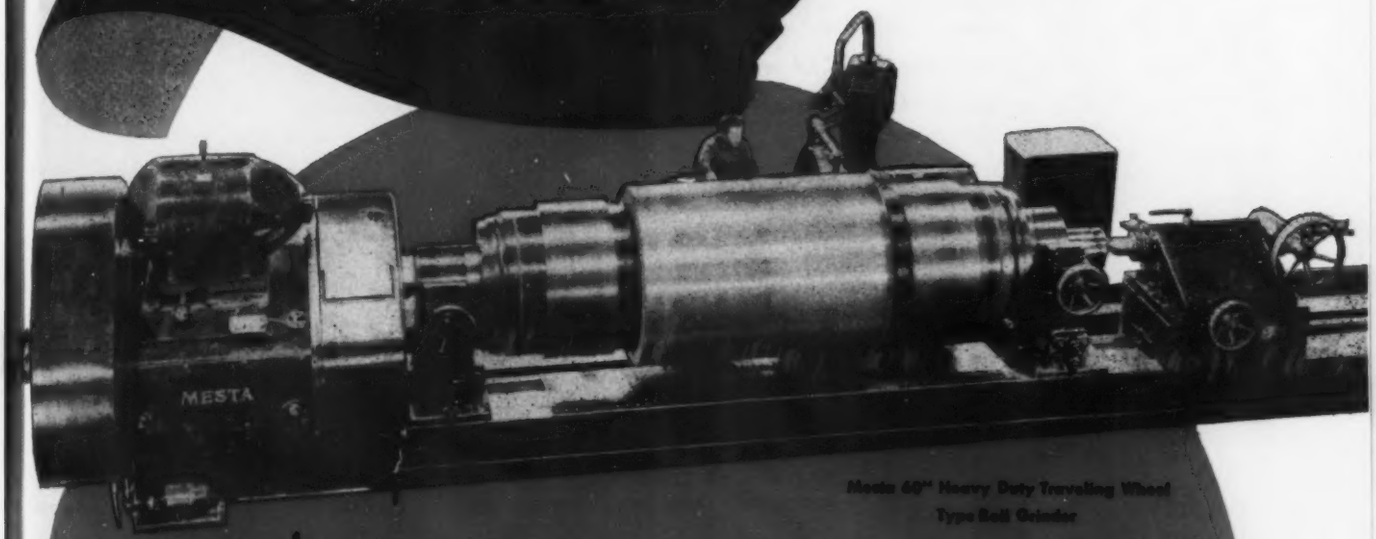


accurate forms to prevent the formation of minute flats that are responsible for producing annoying needle-like slivers from die steels. This method of manufacture forms sharp diamond-shaped points on

Turn to Page 120

MESTA
Roll Grinders

Mesta Roll Grinders of simplified design are the most accurate and dependable grinding machines available today. Built with precision for the finest finishing and with ruggedness for the heaviest roughing.



Mesta 60" Heavy Duty Traveling Wheel Type Roll Grinder

Mesta 40" Heavy Duty Traveling Wheel Type Roll Grinder

Designers and Builders of Complete Steel Plants

MESTA MACHINE CO., PITTSBURGH, PA.

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Nash "surviews" the light car market with a 1500 lb convertible . . . Car would use foreign-built engines . . . SAE holds its 1950 annual meeting . . . Boyd gets Horning medal.

by Walter G. Patton

Detroit—Light car enthusiasts have had their hopes revived again by the recent series of "Surviews" (combined survey and preview) Nash is holding in several large U. S. cities to determine whether the American people really want a light car weighing less than 1500 lb and selling in the $1000 price bracket.

Public Not Interested

It will be recalled that several years ago General Motors had such a car just about ready to go into production. At the last moment top management reversed an earlier decision to go ahead.

Like GM, Ford was working intensively on a light car at the time. The Ford design apparently has never been as close to production as the GM model. Both Ford and GM have insisted that the public, while approving many features of the light car, will not buy such a car in preference to a good used car.

Nash has taken some unusual steps to help the company arrive at a decision. Nash engineers have designed and hand-built a pilot model which several thousand guests are being invited to inspect. The company is also mailing 250,000 questionnaires to obtain additional information.

Will Use Foreign Engines

The proposed Nash (n.x.i.) is a two-passenger model whereas the GM light car carried four passengers comfortably. Nash is planning to use foreign engines, both to stimulate foreign sales and minimize development costs. The car is designed so that it can be built in relatively small volume—100,000 per year—and still sell at $1000 or less.

After seeing the new car last week most observers agree that the new Nash is undoubtedly one of the most attractive entries yet in the American light car field. Nash officials agree that the $64 question is whether or not the American public will buy such a car in preference to a good used car, particularly one selling at a lower price.

Even if the public expresses a strong preference for the new model, it will be a year before tooling can be completed and production is started.

It should be emphasized that this is not the full-size car Nash has already tooled for and will introduce next spring.

Reveals Proposed Specs

Incidentally, Nash is proposing to build its n.x.i. car in two series, essentially identical, but differing as to engine horsepower and transmission. The following specifications have been proposed for the two cars which are designated as "A" and "B."

	Car "A"	Car "B"
Wheelbase	84 in.	84 in.
Overall length	145 in.	145 in.
Overall width	62 in.	62 in.
Weight	1350 lb	1450 lb
Overall height	53 in.	53 in.
Head room	30 in.	30 in.
Leg room front of seat	27 in.	27 in.
Engine hp	18	36
Transmission speed forward	3	4
Max. top speed	60-65 mph	65-70 mph
Fuel consumption	45-50 mpg	35-40 mpg
Approximate price, delivered	$950	$1000

To keep down the selling price, Nash engineers use no radiator ornament or chromium trim. The hood, bumper, lights and front fenders are combined into a single counterbalanced unit. This unit swings up for servicing. There is

WHEELABRATOR® saves $10,275 a year

for the SAWBROOK STEEL CASTINGS CO., Lockland, Ohio

The Wheelabrator 72" Twin Table, installed at Sawbrook Steel Castings Co., is effecting a direct, traceable saving of $41.10 every working day.

Steel castings weighing from 50 lbs. to 3500 lbs. each are being handled in this equipment. The machine replaced a humane-type airblast table and a large airblast room with monorail conveyor, both of which involved high cleaning costs, long cleaning periods and constant maintenance expense. Comparative cleaning costs are summarized in the chart below.

The experience of Sawbrook in reducing cleaning costs and alleviating other cleaning problems is typical of hundreds of other plants using Wheelabrator equipment. We would be glad to have the opportunity to show you by convincing tests and concrete facts how the Wheelabrator can do the same for you . . . there is no obligation, of course.

COST COMPARISON

at the Sawbrook Steel Castings Co.

This jobbing foundry produces steel castings weighing from 1 pound to over a ton. Three cleanings are needed — (1) in the green, (2) after annealing, and (3) finish cleaning.

	FORMER METHOD	WHEELABRATOR METHOD
MACHINES	Airblast Room Humane Airblast Table	72" Wheelabrator Twin Table with three Wheelabrator Units
PRODUCTION	30 tons daily	30 tons daily
LABOR REQUIREMENTS	6 men, 50 man hours daily	3 men, 24 man hours daily
COST PER TON	$4.75	$3.38

SAVINGS

per ton	per day	per year
$1.37	$41.10 (30 tons)	$10,275 (250 days)

New, informative book gives complete, concise information on all phases of airless blast cleaning. Write today for Catalog No. 74-A.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

American WHEELABRATOR & EQUIPMENT CORP.

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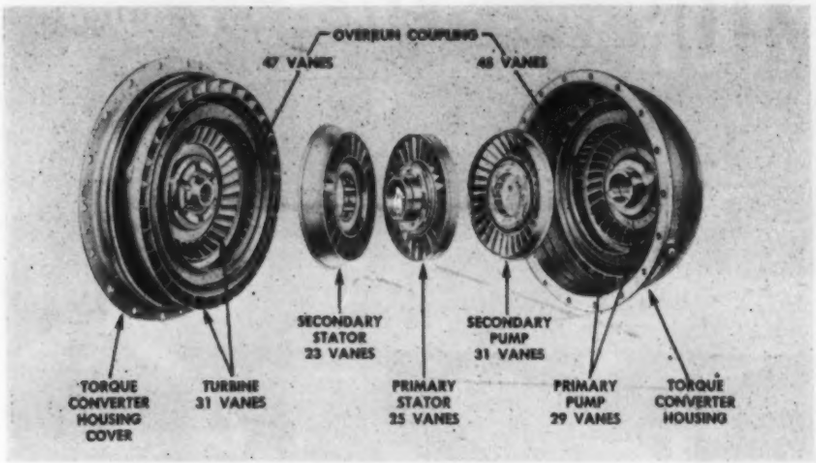

PRECISION-BUILT PARTS: Shown in the illustration are the major components of the new Chevrolet Powerglide automatic transmission. In addition to the now familiar pump, turbine and stator elements, Chevrolet has added an over-running coupling that provides immediate engine breaking during deceleration. This unit also permits push starts at 12 mph. These parts are all brazed assemblies of metal stampings.

a large luggage compartment back of the single seat with access only from the inside of the car.

The model being exhibited is a roadster. A 2-door, 2-passenger coupe is also being considered. As in the case of other Nash cars, the body and frame construction will be integrated into a single unit.

T. A. Boyd Gets Horning Medal; Lecture Covers Fuel Research

We would like to commend as one of the most readable technical papers to come out of Detroit in several years, "Pathfinding in Fuels and Engines," by T. A. Boyd of the Research Laboratories Div. of GM. Mr. Boyd was given the Horning Memorial Medal at the 1950 SAE meeting in Detroit recently. He is the third member of the trio consisting of himself, Thomas Midgley, Jr., and Charles F. Kettering who collaborated in producing antiknock fuels containing tetraethyl lead. Many details of the search for better fuels heretofore undisclosed are revealed in Mr. Boyd's paper.

The start on the problem was made in 1916 in an old building that had been used as a tobacco warehouse. According to Mr. Boyd, the first picture of pressure events in an engine cylinder were obtained by using a one-cylinder air cooled engine, a British optical indicator, a piece of photographic paper wrapped around a tomato can, two pieces of lath and a pair of shingle nails for pivots.

Investigation Methods Reviewed

From this humble beginning combustion studies have progressed until, among others, the following methods of investigation have been used: (1) Snatching samples of gas at selected times in the cycle and determining their compositions; (2) photographing the progress of the flame in the cylinder; (3) comparing the frequency of pressure surges in the pressure charge with that of the sound of the knock; (4) dissecting the light from engine combustion by means of a spectroscope; (5) studying changes in composition of the non-luminous charge ahead of the flame; (6) measuring the temperature of the inflamed gases in the engine; (7) making high speed motion pictures of knocking and non-knocking engines; (8) studying the possible place of free radical chain reactions in the combustion of hydrocarbons.

Aniline Compounds Discovered

The first successful anti-knock compound was iodine. During World War I the important discovery was made that the chemical structure of a fuel is the most important factor in respect to knocking tendency.

Later it was discovered that certain aniline-type compounds are effective knock suppressors. But an experimental car operating successfully at 7 to 1 ratio had such an odorous exhaust it was dubbed "The Goat."

For a time, selenium and tellurium seemed to offer promising antiknock possibilities. But limited supply and a bad odor eliminated these compounds from serious consideration.

With the aid of the atomic table, based on the theory of atomic structure and chemical valence, the researchers then went on a "scientific fox hunt." After extensive investigation, tetraethyl lead which had 50 times the antiknock effectiveness of aniline was selected.

An equally exhaustive investigation of the new lead compound had to be conducted. A satisfactory method of producing the compound in adequate quantities had to be developed. The problem of removing deposits from engines was attacked by adding bromine which, in turn, called for the development of a process for extracting this element from seawater.

Investigation Began in 1926

Investigation of fuel structures began in 1926. The general correlation between knocking characteristics and molecular structure was carefully recorded. Out of these studies has come knowledge of priceless benefit to both the automotive and petroleum industries. Also out of the systematic knowledge built up by the hydrocarbon studies came Triptane which formed the keystone of the high octane aviation gasoline produced during World War II.

In his lecture, Mr. Boyd points out that the efficiency of an average automobile engine has been boosted 30 pct since 1930. This represents a saving of $2 billion annually or the daily output of 1500 wells producing 1000 barrels per day. In the light of recent research, he said, another 30 pct saving is available through the use of higher compression engines. And even this is not the end, he emphasized.

NEW PATENTED STEEL BAR SAVES YOU MONEY 4 WAYS

PROVIDES 4 IN 1 IN-THE-BAR-QUALITIES

Here is a cold-finished carbon steel bar, produced by a patented LaSalle process, that possesses in-the-bar a unique combination of *all four* desired qualities . . . Strength . . . Machinability . . . Wearability . . . Minimum Warpage. STRESSPROOF is a high strength steel (twice as strong as ordinary cold-finished shafting) and is used without heat treating. It machines well, too—fully 50% better than heat-treated alloys of the same hardness. It possesses better wearability than many heat-treated carbon or alloy steels, and has been used successfully to replace case-carburized steels. Furthermore, because STRESSPROOF is stress relieved, warpage after machining is negligible, and straightening operations can be eliminated. Yet STRESSPROOF costs little more than ordinary cold-finished bars. It is also furnished ground and polished to close accuracies.

Stocked by Leading Steel Warehouses

La Salle STRESSPROOF

Reg. U. S. Pat. Off.

SEVERELY COLD-WORKED FURNACE-TREATED STEEL BARS

SEND for FREE

ENGINEERING BULLETIN

"New Economies in the Use of Steel Bars"

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Please send me your STRESSPROOF Bulletin.

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WEST COAST PROGRESS REPORT

Forecast for 1950 indicates plate production is scheduled below that of 1949 shipments . . . Fate of Columbia's L. A. mill still uncertain.

Digest of Far West Industrial Activity

by J. P. Reinhardt

San Francisco—Production of rolled steel products in 1950 in the seven western states by the nine primary producers will exceed the actual production in 1949 by approximately 433,000 net tons according to detailed forecasts completed this week.

Increased production this year is indicated for all seven product classifications on which figures could be developed with the exception of plate. Last year approximately 949,000 net tons of plate were produced in the West and forecasts for 1950 show an anticipated production of approximately 897,000 tons or a drop of 52,000 tons.

Plate Production Declines

This decline in plate production may anticipate termination or curtailment of pipe line contracts in the hands of Consolidated Western Steel Corp. and Kaiser Basalt. However, the decline is not significant enough to warrant too much speculation in that direction. It is no trade secret that Kaiser Steel Corp. will, of necessity, within the next few months want to divert some of the ingot capacity which has been going into plates into its new hot strip mill and Columbia which draws its hot coils from Geneva for cold reduction at Pittsburg, Calif., will probably need additional coil stock there as operations improve and hence Geneva will have a lowered plate capacity. Here again, it must be pointed out that these deductions are only in the realm of conjecture.

An overall increase in production of sheet, strip and tinplate of approximately 206,500 tons reflects increased activity at the Pittsburg plant of Columbia and the start of operations of Kaiser's hot strip mill this spring.

The increase of approximately 29,000 tons in production of electric weld and buttweld pipe, of course, reflects the anticipated operation of the new Yoder mill at Kaiser's Fontana plant within the next several months.

Structural Output higher

Only a modest increase of about 13,000 tons is noted in anticipated production in standard structural shapes over last year's actual production. The 1950 estimate of 280,000 tons is considerably below the 501,000 ton production estimated for that product in 1949. Actual production of structural shapes in 1949 was 266,956 tons (not 226,956 as reported on these pages through a typographical error last week).

An increase of about 183,400 tons in the forecast of production of reinforcing bars and other hot-rolled bars and small shapes indicates optimism in regard to public works construction in this section during the year.

Forecast for '50 Made

For the first time, it is possible to present a rather accurate breakdown in this classification for reinforcing bars as separate from other hot-rolled bars and small shapes. Almost complete cooperation of producers in giving THE IRON AGE detailed forecasts made it necessary to estimate the breakdown in these two classifications for only about 32 pct of the total of hot-rolled bars and other shapes reported. It will be noted from the table that this breakdown is almost 50-50.

Production of wire rods and wire products show an increase of

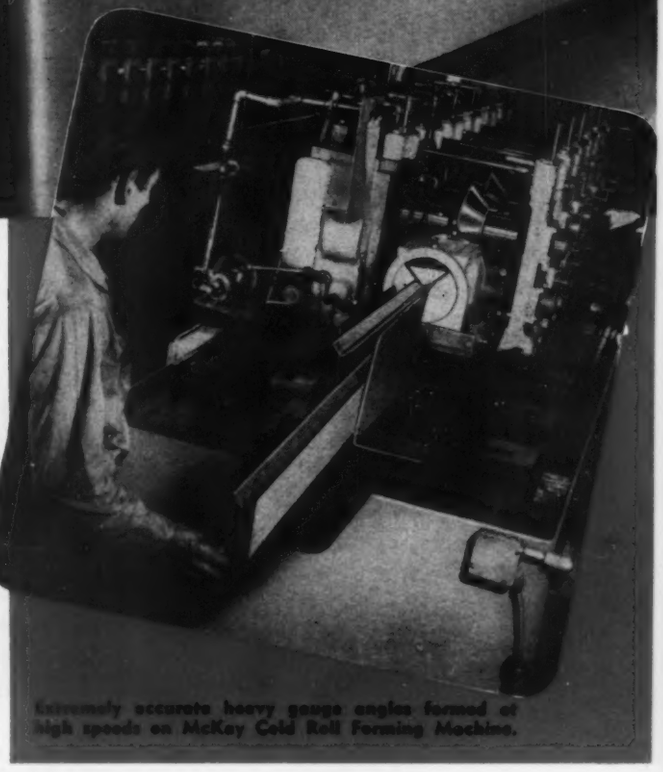
McKay Forming Machines Mean Low Costs, Higher Production, Increased Accuracy to *Roll Formed Products Company*

Heavy gauge channels produced from continuous coil at a rate exceeding 110 feet per minute.

Accurate, high speed production of heavy gauge angles and channels 16 hours a day — year in and year out. That's the story of the McKay Cold Roll Forming Machines at the ROLL FORMED PRODUCTS COMPANY, Youngstown, Ohio. And that's the story of McKay Machines in steel fabricating plants the nation over.

No other forming machine can match the advanced features or the built-in ruggedness found in the McKay. It's engineered to deliver increased production of more accurate work while holding scrap loss and maintenance costs to an absolute minimum.

Before you buy be sure to look over the McKay—there's no obligation, whatsoever.



Extremely accurate heavy gauge angles formed at high speeds on McKay Cold Roll Forming Machine.

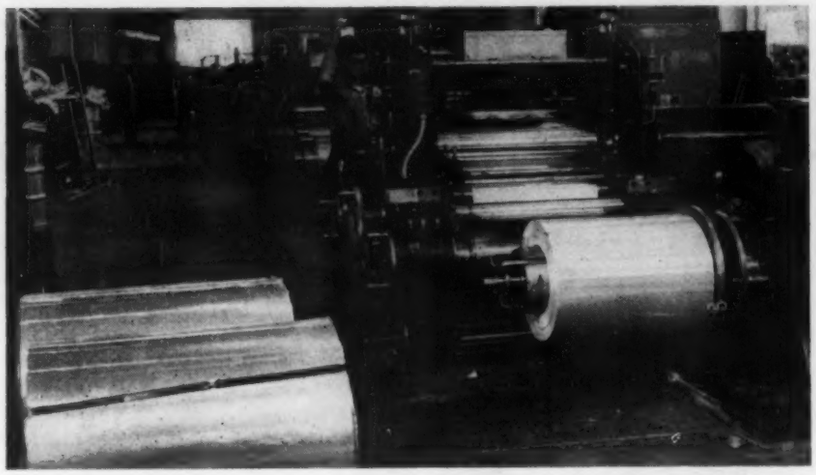
MORE MACHINE

FOR YOUR MONEY

THE McKAY MACHINE COMPANY

Engineers and Manufacturers of Sheet, Tin, and Strip Mill Equipmer

YOUNGSTOWN, OHIO



ALUMINUM FOIL: In the aluminum foil rolling process, coils of aluminum sheet 0.026-in. thick are shipped from Kaiser Aluminum's Trentwood rolling mills near Spokane to the Permanente plant, near San Jose, Calif., where it is rolled in successive stages to thicknesses as minute as 0.00025 in. A 900-ft long coil from Trentwood, when reduced to 0.00035 in. thickness, emerges more than 13 miles long. Each pass through the mill reduces the foil approximately 50 pct. For the thinnest foil, as many as six passes are required.

about 46,000 tons over the 1949 figures.

Forecasts indicate that approximately 3,807,000 tons of ingots will be poured during 1950 for rolling.

Cooperation of producers in assisting to develop these forecasts has been almost 100 pct and it was necessary only to estimate product mix for a little more than 2 pct of the total tonnage involved.

In the light of this 1950 forecast of western production it is interesting to refer to the prewar normal annual consumption of several of these products and to take a look at an estimate made by a very competent market analysis about 8 years ago as to the postwar normal annual consumption.

For instance, structural shapes and sheet piling markets in the seven western states before the war was approximately 198,000 tons and today it is anticipated that production of shapes alone will come to about 280,000 tons. The demand forecast made years ago on this product for the postwar period was 247,000 tons.

Production Above Expectations

Whereas the normal plate market in this area before the war was approximately 160,000 tons and the postwar normal market was estimated to be about 224,000 tons, it is now planned to produce about 897,000 tons.

The bar market prewar was estimated at about 300,000 tons and the postwar market was expected to be about 465,000 tons. It will be noted that production is scheduled this year for 747,000 tons.

In the case of sheets, strip and tinplate, scheduled production still is below even the prewar normal annual consumption which was said to be 683,000 tons and well below the forecast made 8 years ago for the postwar normal annual consumption of about 880,000 tons.

These differences between long-range forecasts and actual marketing conditions accent the phenomenal industrialization of the West which has confounded everyone who made prognostications in the prewar and war period.

Forecast of Production of Rolled Steel Products in Seven Western States for 1950

	Net Tons
Plates	897,000
Sheet, Strip and Tinplate	539,000
Electric Weld and Buttweld Pipe	113,000
Standard Structural Shapes	280,000
Reinforcing Bars	373,000
Other Hot-Rolled Bars and Bar Shapes	374,000
Wire Rods and Wire Products	194,000
Miscellaneous	40,000
Total Rolled Products	2,810,000
Total Ingot Tonnage to be Poured	3,807,000

Fate of Columbia's Cold Reduction Mill Still Uncertain

Los Angeles—While presidents of U. S. steel subsidiaries debated policy in the East, best advice here still was that Columbia Steel Co. will go ahead with plans for converting the former aluminum reduction plant here into a cold-reduction sheet steel mill.

An announcement is expected before the end of the month as to whether Columbia will go ahead with plans and, if it will, how much more delay is probable.

While some speculate that Columbia feels steel facilities in the West now are adequate, all evidence points to the eventual usage of the plant by the steel company.

To Go Ahead with Plans

The sprawling buildings were purchased from the government after considerable red tape which delayed the process many months during the most critical times of the steel shortage. With millions invested, Columbia has cleared out most of the unusable aluminum equipment and has a skeleton construction and maintenance crew on the grounds.

Several months ago, Irving S. Olds, chairman of the board for U. S. Steel, reiterated in Salt Lake City that his company would go ahead with plans for the cold-reduction mill.

Development Program Delayed

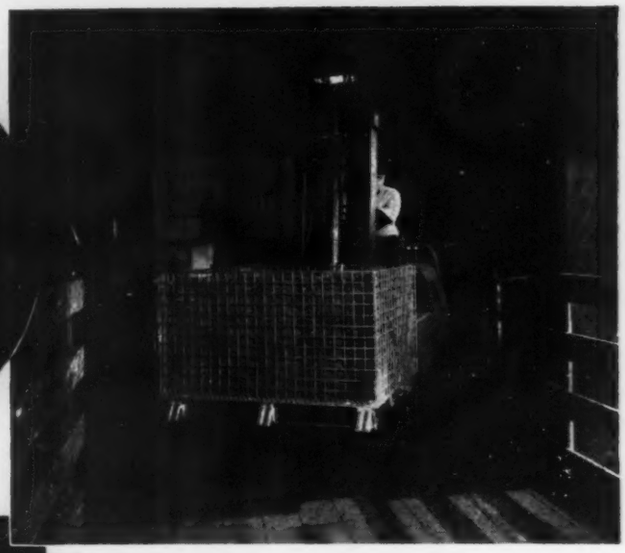
Alden Roach, president of Columbia, is said to have assured Los Angeles Chamber of Commerce officials only recently that the development program had been delayed but not dropped.

At the time of the purchase of the property from the government, Mr. Olds and Benjamin Fairless told of plans which would have had the mill operating by this time. They may have had to redesign several features and are certain to have required new and lower estimates for equipment.

Whatever their eventual decision, they have a multi-million dollar investment awaiting action.

Pittsburgh CARGOTAINERS

Speed Operations and Reduce Handling Costs



Above, CARGOTAINER being loaded into delivery truck at vendors holds 345 castings—more than 2700 lbs. Previously only 88 castings weighing 704 lbs. were handled in odd size drums by one man in the same amount of time. Uniform size of CARGOTAINERS allows easy stacking after castings are loaded—also affords more efficient handling from inspection through shipping.

CARGOTAINERS in above photograph are received at assembly plant from vendor—are easily unloaded directly from truck to storage space. Note ease of stacking and minimum of storage space required, also the variety of parts that pack easily in CARGOTAINERS.

At right, CARGOTAINERS again save additional handling time and costs at end of machining process on castings. Parts are easily packed back into CARGOTAINERS and moved to storage to await final assembly. The awkward gap between vendor and assembly plant is easily bridged with versatile, maneuverable CARGOTAINERS.

For further information on Pittsburgh CARGOTAINERS, write Pittsburgh Steel Products Company, Department IA, Grant Building, Pittsburgh 30, Pa.

CARGOTAINERS by Pittsburgh Steel Products Company
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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

President Truman losing popularity on Capitol Hill . . . BLS data includes worker productivity in the basic steel industry . . . Deficit financing continues.

by Eugene J. Hardy

Washington — The fact that President Truman has been losing popularity on Capitol Hill in recent months is demonstrated in part by the current squabble over legislation to curb labor monopolies. Until just a few months ago, it was a bold Fair Dealer who even intimated that labor unions should be curbed by federal law.

Now, Democratic leaders in the Senate and House are worried by the grass-roots resentment against John L. Lewis and alleged monopolistic unions like the United Mine Workers. Election year notwithstanding, there is growing sentiment for additional curbs on national unions.

Old View Loses Popularity

It is becoming increasingly less popular to stand on the old platform that labor unions are something apart from the rest of organized society and should not be touched. Even Sen. Lucas, D., Ill., Senate Majority Leader who is facing a stiff fight for reelection this year, makes no secret of his differences with the White House that stem from Mr. Truman's failure to act in the coal dispute. An even stronger pro-labor advocate and one of the leaders in the fight to repeal the Taft-Hartley Act, Rep. Jacobs, D., Ind., has urged the President to use this law to bring John L. to terms.

One senatorial hot potato that will bear watching in the coming months is the recent report of the Robertson subcommittee of the Senate Banking Committee. Senator Robertson, D., Va., said in effect that UMW probably constitutes a labor monopoly. But the Banking Committee unloaded the report at the doorstep of the Senate Judiciary Committee, recommending that the latter group take what action it felt was necessary.

The Judiciary Committee is now split several ways over this hot issue. It cannot ignore the Robertson report. Its path of action from here on in will be determined by events in the labor field. If conditions get worse, the committee probably will legislate against unions like the UMW. If they get better, the committee will "study" the report indefinitely. The next few weeks may tell the story.

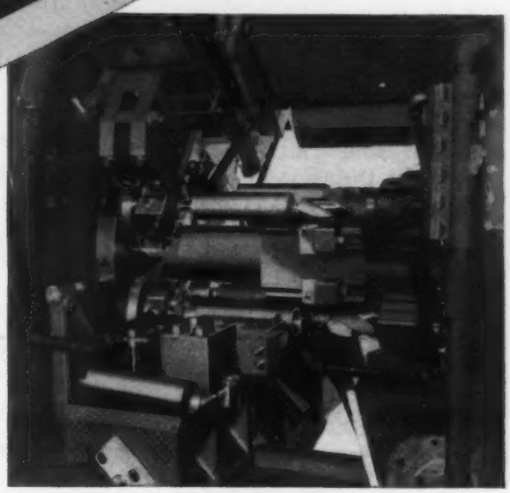
Worker Productivity in The Steel Industry To Be Released

The first postwar data on worker productivity in the basic steel industry will be made available by the Bureau of Labor Statistics within the next 2 to 3 months. The study, covering blast furnace operations, steel works and rolling mills, will show indexes of output per man-hr and output per production worker for the period 1939-1948.

The steel indexes, and other productivity studies to be released this year, will be of extreme significance, since BLS is now using the complete production and employment data contained in the 1947 Census as a point of reference and is able to relate this data to the 1939 Census and similar data issued during the intervening years.

In addition to the new steel index, BLS will also release, within the next 2 to 6 months, initial reports on productivity in the following industries: Metal-forming equipment, 1939-48; railroad freight cars, 1939-48; electrical

What does extra-heavy drilling cost you?



Acme-Gridleys will outperform old-fashioned methods every time—*and at less cost.* Sturdy basic machine construction and positive, direct camming permits pushing large diameter drills at heavy feeds while holding close concentricity—the .002 limit on the job illustrated is typical.

Unless your present machining methods can match this performance, you owe it to yourself to investigate what modern Acme-Gridley Automatics can do for *your* cost figures. May we give you more information? Ask for new bulletin T.P.-44, showing Top Performance on 44 jobs.

JOB FACTS

PART: Steel Shaft
SIZE: 10" x 2⅜" Diam.
MATERIAL: B 1112 Steel Bar Stock
MACHINE: Acme-Gridley 2⅝" RB-4 Spindle Automatic Bar Machine
OPERATIONS: 12
TOLERANCE: .002 Concentricity on All Machined Diameters
MACHINING TIME: 1 Minute, 30 Seconds

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Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics · Single Spindle Automatics · Thread Rolling Machines · Automatic Threading Dies and Taps · The Chronolog · Limit, Motor Starter and Control Station Switches · Counters · Solenoids · Centrifuges · Contract Manufacturing

equipment, 1939-47; mining machinery, 1939-48; household electrical appliances, 1939-48; and home radio receivers, 1939-47. An initial report on the gray iron foundry industry will also be gotten underway during 1950. The following detailed productivity studies will be revised during the year and brought through 1948: Machine tools industrial equipment and construction machinery.

President Truman Favors Continued Deficit Financing

Biggest news in the federal budget for the fiscal year 1951 was not the $42.4 billion total, nor even the additional $5.1 billion deficit. Rather it was the espousal by President Truman of an indefinite period of deficit financing and his apparent embracing of the early New Deal theory which held that the public debt doesn't mean anything because "we owe it to ourselves."

The President surprised many Washington observers who felt that he would at least pay lip-service to a balanced budget, as had been indicated in his Midyear Economic Report last summer. But Mr. Truman tossed all sound fiscal management to the winds and held out only a promise that his welfare programs will "provide a solid basis for moving toward budgetary balance in the next few years." Not next year, or even the next, but sometime in the indefinite future. Even his tax program will not help much, but will only "bring nearer the time when the budget can be balanced."

Justifies His Program

In submitting the budget to Congress, the President maintained that "the soundness of a fiscal program in the expected margin between receipts and expenditures. A prudent program must meet much broader tests, if it is to serve the long-range interests of the people."

He then went on to say that this was all for the people who demand the services envisioned in the "Fair Deal" program. The government will play an ever-expanding part in raising the American economy to new heights, according to Mr. Truman.

His justification for even bigger government and bigger deficits is that his policies and those of his predecessor have already made government so big, that to call a halt now "even where feasible" would "involve economic loss and dislocations and may cause serious damage to parts of the economy."

Continuation of deficit financing, says Mr. Truman, "is directed at achieving a budgetary balance in the only way in which it can be achieved—by measures which support rather than impair the continued growth of our economy." It would appear that the President is advocating a sort of fiscal treadmill with national output trying valiantly to support ever-increasing federal spending,—resulting in disintegration of the currency and complete economic collapse.

Asks Increase in Fines For Antitrust Law Violators

First legislation to be introduced as a result of the lengthly hearings of the Monopoly Subcommittee of the House Judiciary Committee (THE IRON AGE, Nov. 24, 1949, p. 48) is a bill to increase the maximum antitrust penalty from $5000 to $50,000. The measure (H R 6679), introduced by Rep. Walter, Dem., Pa., a member of the subcommittee, would set a permissible maximum of $50,000 for all fines imposed under the Sherman and Clayton antitrust laws.

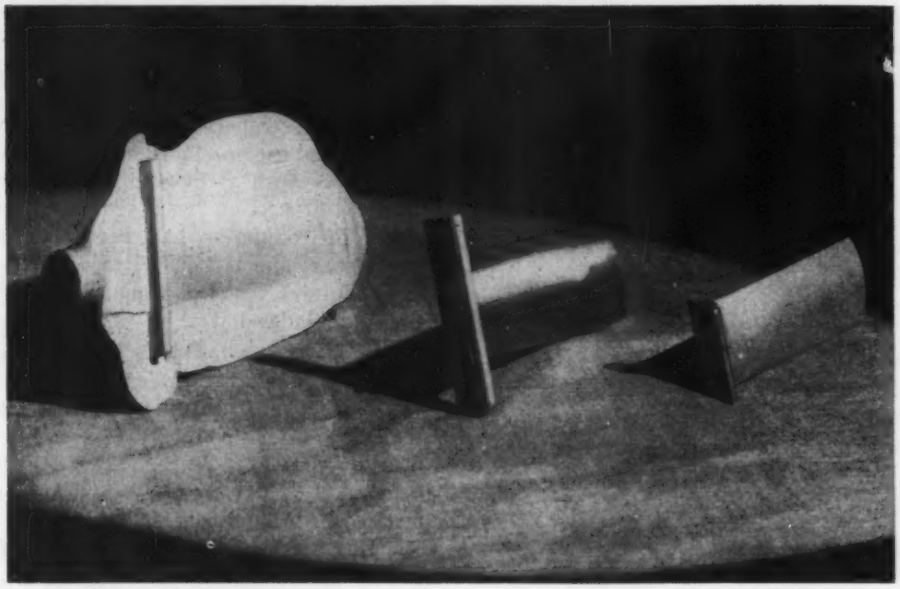
Mr. Walter claims the increase is necessary because the present $5000 penalty provides "little or no deterrent to violators." He further points out that public hearings indicated that there is "almost no objection" to statutory increase in the amount of fines. While there is no disputing this statement, it should be noted that it would be a fool-hardy businessman who would give testimony objecting to an increase in fines for those found guilty of violating the antitrust statutes.

Mr. Walter hopes for early public hearings on his measure and enactment by mid-summer.

THE BULL OF THE WOODS By J. R. Williams

MY, BUT THAT LOOKS DELICIOUS, FRENCHY! CAN YOU GET ME TH' RECIPE FOR IT?
SURE, FOR YOU I GAT DEES ON PAPER-- EES VERY GOOD!
I WANT A COPY OF THAT, TOO!
I MUST GET THAT FOR MY WIFE!
I'M CURED OF EATIN' IN A GANG! I TOOK AT LEAST TEN SURPRISE RECIPES TO MY WIFE-- DUTCH, HUNGARIAN, GERMAN, SCOTCH, ITALIAN, ETC.--AND THEY WERE ALL FOR BREAD PUDDIN'-- IT GAGS ME NOW!
J.R.WILLIAMS 1-20
THE NEW OLD ONE
COPR. 1950 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

FIG. 1—The forged blade (left) is trimmed and coarse-buffed (center), then machined for dovetail mounting (right).



FORGING and WELDING TITANIUM

By L. B. FRAZIER
Thomson Laboratory,
General Electric Co.,
West Lynn, Mass.

SUMMARY: Research and development work on ductile titanium conducted at the GE Thomson Laboratory has made available information concerning the forging and welding of titanium. This article discusses these forming operations, including inert-arc and resistance welding. Typical welder constants are given and some notes are included covering the metallography of titanium.

WHILE titanium is not yet available in commercial quantities, it appears likely that it will become readily available within the near future. The Thomson Laboratory has been conducting research and development work on ductile titanium and some of the findings of this work, dealing specifically with forging and welding, are described in this article.

Titanium is readily forged. Forging is best done at temperatures from 1600° to 1800°F. Between these temperatures titanium is very soft and ductile. Above 1850°F there is considerable danger that gas absorption will cause rough surfaces. Below 1500°F the metal becomes harder to forge and retains some cold work after cooling. Too much working at room temperature decreases the ductility to such an extent that cracking is likely to occur.

Small reductions in the diameter of titanium round rod may be made by cold swaging. Large reductions, however, require intermediate anneals between passes through the swager.

Forging and Welding Titanium

Continued

To explore the forgeability of titanium, experimental lots of gas turbine stator blades and rotor blades were made in the equipment regularly used for forging steel blades. About 20 rotor blades and 20 stator blades were forged and machined for testing.

Certain deviations from the forging practice used on steel were found necessary, chief among these being the elimination of cold swaging and the lowering of forging temperatures. Cold swaging was eliminated because it caused excessive work-hardening and breaking of several of the test bars. The comparatively poor swaging characteristics of titanium are thought to be related to its hexagonal lattice structure. Hardness due to composition also affects swageability; pieces of lower hardness (Rc 18) were only cracked slightly in swaging operations which crumbled the harder material (Rc 28). It appears possible that future refinements in the reduction metallurgy of titanium may provide great improvements in swageability.

Because it was necessary to sandwich the forging of these developmental blades between production lots, the stator blades were upset and pressed to the blocked form using the same heating methods and temperatures (1950°F) used for steel blades. After blocking, the blades had a very rough surface. The surface of the previous form appeared to have been broken into islands while the interior metal flowed more freely. This was confirmed by a microstudy of the metal at the surface and immediately below.

In the micrograph a white layer appeared at the metal surface below the oxide layer. This was quite hard and was judged to be a nitride of titanium. Oxidation appeared to have penetrated its outer surface. There was some increase in the hardness of the metal beneath the white layer, as indicated by the series of Knoop hardness test results listed below:

Inches from edge	0.002	0.008	0.014	0.022	0.029	0.036
Knoop values	805	396	396	343	316	316

Hammer forging the blocked blades at 1700°F smoothed up the surface roughness considerably. On several of the blades, however, the roughness was folded in at the base fillet. The depth of this fold was not great and it was ground out, leaving sufficient material for finishing the blade. After the blade region was coarse buffed to remove the slight remaining roughness, the blades were ready for machining. Samples of the forged blade are shown in fig. 1.

After the stator blades were forged, 23 larger sized rotor blades were forged. Modification of the forging temperature to 1700°F for all operations except the upsetting produced much smoother blades—both as blocked and as drop-hammer forged. Upsetting was completed before the cause of roughness had been determined and hence was done at 1900°F. Again, islands of the original slug caused some roughness in the finished blades but this was easily buffed out.

Although the hardness of the titanium bar used for these rotor blades ranged up to Rc 38, the higher hardness did not, in any way, cause difficulty in hot forging. Cold swaging was eliminated because of experience with the stator blades; the bars were machined to shape for upsetting. All of the blades started were successfully upset, pressed, and hammer forged.

In general, the forging of titanium turned out to be a relatively simple process. The temperatures which produced the smoothest forgings were 1600° to 1700°F; in this temperature range the metal flowed easily with no cracking or tearing.

Welding Titanium

Since melted titanium has such an affinity for gases, several of the conventional welding techniques cannot be used. Those techniques which can be used, however, produce very satisfactory welds. Included in this latter category are spot-welding, seam welding and inert-arc welding. A related technique, oxyhydrogen cutting, has also been successfully used on titanium.

Satisfactory spot welds are made easily on titanium if the surfaces are reasonably clean. The shear strength of such welds is approximately equal to that obtained in steel of equal thickness. Welder setting data are becoming available but in the absence of data for a specific

FIG. 2—Sheet titanium welded by inert-arc process. Smooth weld produced by automatic movement of the electrode.

METALLOGRAPHY OF TITANIUM

The preparation of metallographic specimens of titanium is reasonably simple and follows conventional procedure through the coarse polishing step. Each metallographer develops his own technique for final polishing, depending upon his experience and the polishing materials he has at hand.

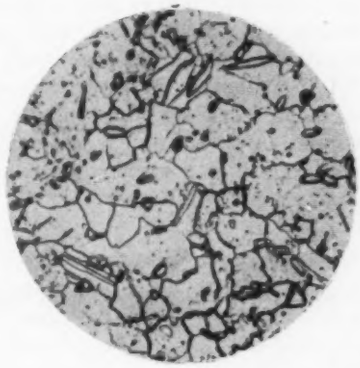
In the Thomson Laboratory, the following procedure produced good results:

(1) Polish on a wax wheel using levigated alumina.
(2) Polish on micro cloth using No. 2 Diamond Hyprez.
(3) Final polish using micro cloth with Shamva as the abrasive.

The best etchants seem to be a mixture containing, by volume, 1 part 48 pct hydrofluoric acid, 1 part concentrated nitric acid, and 3 parts glycerine. This was recommended by the Remington Arms Co. and produces the best results.

Photomicrographs of typical structures of commercially pure titanium are shown in the accompanying illustrations.

Photomicrograph of 100 lb titanium ingot. Shows porosity caused by gas entrained during pouring, platelets of hard constituent, and general grain size. 100X. Etchant: HF-HNO_3-glycerine.



Forged and rolled titanium bar showing grain size and general breakup of hard constituent. 500X. Etchant: 3 pct HF.

application good spot welds can be obtained by sectioning, etching and inspecting sample spots.

Seam welding techniques stem from spotwelding. To produce sound seam welds, titanium sheet surfaces must be very clean and entirely free from scale. If these requirements are observed, the welds produced by resistance seam welding are sound and strong. Peel tests shear the metal along the edge of the weld rather than separating the sheets through the weld.

Preliminary development in the welding of titanium at the Thomson Laboratory indicates that titanium sheet can be spot welded, seam welded, and inert-arc welded. The early spot welds were made with surprising ease over a wide range of settings. More recent work has been done to show the best proportions of weld diameter to sheet thickness.

The greatest difference observed between welds in titanium and welds in steel is in tension and bending tests. Welds in titanium appear to be able to sustain satisfactory loads. Before permanent deflections have progressed very far, however, cracks appear along the boundary of the weld and the parent metal.

Because of titanium's chemical activity, the

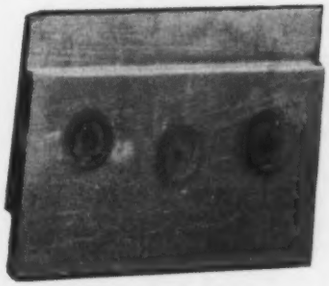


FIG. 3 — Spot welds made on sample of titanium sheet.

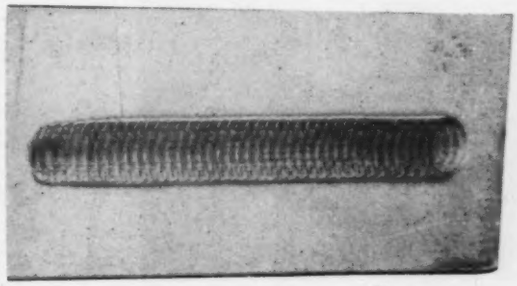


FIG. 4—Seam welds made on samples of titanium sheet. Thorough descaling proved to be the chief requirement of successful resistance welding.

inert-arc process is the only member of the gas and arcwelding family which readily lends itself to the welding of this material. Welds made by the inert-arc process are sound and strong but somewhat brittle at the line of fusion. As yet, no method has been found for increasing the ductility of the metal adjacent to the weld.

The fine, smooth appearance of the weld shown in fig. 2 is characteristic of inert-arc welds in titanium. Tests have shown that it is necessary to exclude air from the underside of the weld during the welding operation to prevent excessive contamination. This can be accomplished by providing a close fitting metal backing or by shielding with either helium or argon gas. Welds properly backed will exhibit bright surfaces.

A typical setting for automatic inert-arc welding of 1/16 in. titanium is given in table I. Helium may be used in place of argon with equally good results. Alternating current may also be used, but the arc is somewhat more erratic than when direct current is used.

Resistance Welding

It is very easy to spot and seam weld titanium and sound spots can be produced over a wide range of welder settings. Sample welds are shown in figs. 3 and 4. However, the oxides formed when this metal is hot rolled or annealed must be removed before resistance welding is attempted, since they are highly resistant to the passage of electric current. The surface may be cleaned by the use of Virgo salts, sodium hydride, or hydrofluoric acid; each of these materials has been used successfully for cleaning the laboratory samples. Oxides which form at room temperature after mill scale has been removed are apparently not harmful and need not be removed before the metal is spot welded.

TABLE I

Typical Setting for Inert-Arc Welding Titanium

Electrode	1/16 in. diam
Gas	Argon
Gas flow	8 cu ft per hr
Speed	27 in. per min
Current	90 amp dc, electrode negative
Backing	Argon, helium, or metal

TABLE II

Welder Constants for Titanium Sheet

Sheet Thickness	0.022 in. sheet	0.060 in. sheet
Condition	Hot rolled, descaled	Rolled, annealed, descaled
Electrode Material	Mallory 3	Mallory 3
Electrode Force	600 lb	1000 lb
Welding Face	3 in. spherical radius	3 in. spherical radius
Timing:		
Squeeze	40 cycles	40 cycles
Current on	10 cycles	24 cycles
Cool	40 cycles	40 cycles

Fig. 5 is a macro cross-section of spot welds on 0.022 in. titanium sheet. It may be noted that the dendritic fusion zone is encompassed by two heat-affected zones. The border between the inner heat-affected zone and the fusion zone is not always clear, since the large grains of this zone grow with the melt to form the dendrites.

The etching of weld samples should be carried

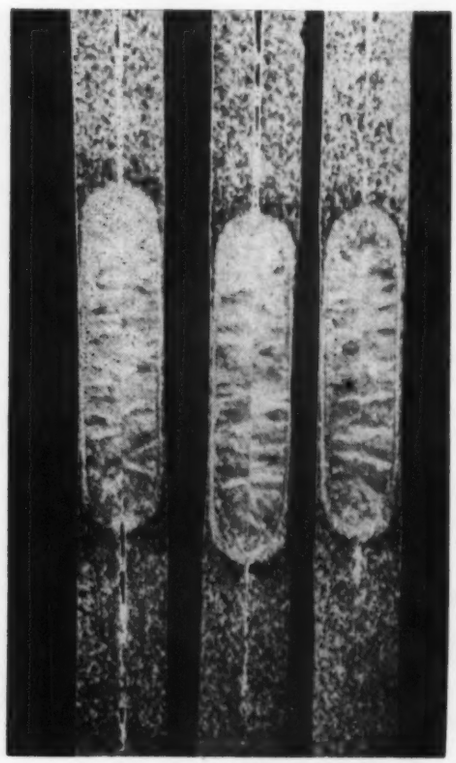


FIG. 5—Etched sections of spot welds showing soundness of the welds and heat affected zones surrounding the weld nuggets.

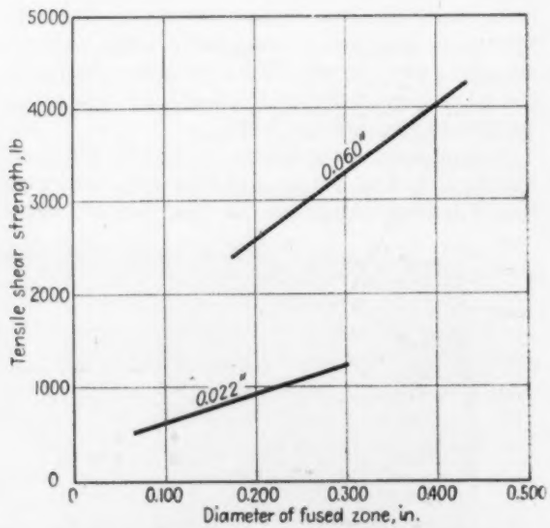


FIG. 6—Tensile shear strength depends upon weld size. Lower curve was determined from pairs of 0.022 in. thick strips of titanium; upper curve from 0.022 in. thick strips.

to the point at which the fusion zone shows best. The diameter of the fused zone has a close correlation with the weld strength. Consequently, etching of the weld sample should be directed toward best showing the fused region. Etchants are discussed in the metallography section which follows.

The curves of fig. 6 are plots of weld strength versus etch size where the etch size is the diameter of the fused zone. As in the case of the inert-arc welds, there appears to be an area of somewhat low ductility at the line of fusion. The tensile shear samples fractured with less deformation of the parent metal than would be found with annealed stainless steels or with Inconel.

Typical welder constants for 0.022 and 0.060 in. sheet are given in table II.

The corrosion resistance of titanium is of great importance. Like chromium, titanium appears to form a very thin but continuous oxide layer which protects the metal from most of the usual corrosive agents. Titanium shows even better resistance than stainless steels to the corrosive actions of sea water.

Commercially pure titanium has mechanical properties of the same order as those of steel. Yield strengths run from 60,000 psi for annealed titanium to 110,000 psi for hard-rolled sheet. Tensile strengths likewise vary from 75,000 psi annealed to 140,000 psi cold worked.

Stress-rupture tests have been made at 300°, 750° and 1000°F. The results appear to confirm the evidence of short-time tensile tests that useful structural properties are maintained to about 800°F.

Fatigue tests show that commercially pure titanium with a tensile strength of 100,000 psi has a 100 million cycle fatigue strength above 50,000 psi.

TECHNICAL REPORTS ON GERMAN CUTTING TOOLS

A SERIES of reports on German metal cutting tool and machine tool industries has been offered for public distribution. They may be obtained from the Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C., at the prices listed. Checks should be made payable to the Treasurer of the United States, and the material should be ordered both by title and number. Prices shown are for mimeographed copies, but photostatic copies can be obtained at slightly higher prices.

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Japan, Captured Enemy Material: Preliminary Evaluation Report, PB 7259, $.50

Measuring Machinability

On a Constant Pressure Lathe

TO the laboratory machinability tests employed in measuring the complex and elusive property of machinability has been added another type, the Constant-Pressure Lathe Test, which gives indication of meeting the several requirements for machinability testing. This new lathe test makes practical the selection of a bar of stock and the determination from it of the probable machinability for the entire lot.

There has been a long-time need for a simple, fast, dependable means of predetermining, from representative small samples of production lots, the turning of machining qualities of free cutting steels. Such a testing method or yardstick is desirable for measuring with a reasonable degree of repetitive accuracy the probable performance of bar stock in commercial machining operations.

Practically all machinability rating methods developed to date have involved the arbitrary selection and holding constant one or more of a number of factors such as the machining operation itself, cutting fluids if used, tool shapes, work size, or tool materials. These usually have been evaluated, in turn, by determining and measuring some other important allied variable, believed to be related closely to the cutting quality.

The production variables include such considerations as the rate of metal removed, tool wear, chip behavior, pressures, measurements of tool, and the amount of heat generated in the cutting operation. The complexity of such tests has restricted their use to better-equipped laboratories and machine shops.

Simplifying and speeding up the machinability testing have been directed toward a number of objectives, including: (1) Shorter testing period; (2) Higher degree of sensitivity; (3) Reproducibility of test results; and (4) Machinability ratings that correspond closely to values already established by conventional laboratory tool-life tests and large scale commercial machining operations.

The Constant-Pressure Lathe Test method, based on the use of a Monarch Machine Tool Co. lathe equipped to provide fixed tool pressures with a constant component in the horizontal direction, was first announced in July, 1949,* following its development in the course of a cooperative research project conducted at Battelle Memorial Institute, Columbus, Ohio, under the sponsorship of Carnegie-Illinois Steel Corp.

The steels embraced by this particular study were types ordinarily machined in automatic screw machine operations, and the machinability ratings based on lathe tests seemed feasible.

A testing method had to be devised that would (1) prove sufficiently sensitive to small differences in machinability; (2) give reliable and reproducible ratings; (3) require minimum time, material and labor; and (4) allow comparisons on the same scale of specimens of different sizes and widely different compositions.

The test method used was based on the fact that when a horizontal pressure of fixed value is applied to the feed mechanism of the lathe, and consequently to the cutting tool, steels of different machining quality cut at different rates. Machinability ratings based on the close relation of these feed variations were obtained on different steels under controlled laboratory test conditions.

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* *"Constant-Pressure Lathe Test for Measuring the Machinability of Free-Cutting Steels," by F. W. Boulger, H. L. Shaw and H. E. Johnson. Transactions of ASME, July* 1949, *p.* 431.

While data accumulated are not regarded as conclusive, they are of sufficient scope, according to Monarch, to indicate that the method will measure the machinability or turning quality of free cutting steels, meeting the requirements of such equipment.

The Monarch lathe used for machinability-testing differs from a standard machine in three particulars. (1) The tool carriage is disconnected from the fixed-feed mechanism and is mounted on anti-friction bearings, so as to move easily along the bed. (2) The lathe is designed to apply a predetermined horizontal tool pressure. (3) A mechanical counter records the number of spindle revolutions and measures tool travel.

Powered by a 5-hp motor and providing 16 spindle speeds ranging from 24 to 1000 rpm, this lathe has a 16½-in. swing and 30 in. be-

tween centers. The spindle bored out, accommodates bars up to 1.5 in. diam. As shown in fig. 1, all of the mechanism common to a standard lathe is removed from the apron except the handwheel and rack pinion. The carriage is equipped with metal shields to prevent chips from falling on the ways of the unit and collecting under the ball bearings on which the carriage is mounted.

Behind the handwheel is a drum around which piano wire of 0.031-in. diam is wound, then carried across three different pulleys, arranged as shown in fig. 1. Weights are suspended from the third pulley. This weighted wire, passing across where the gearbox would be in a conventional lathe, pulls the carriage into the work.

Rate of carriage travel depends not only upon the amount of the weight used, but upon the resistance of the steel test piece to cutting and the chip friction encountered as the work moves over the tool. By adding or subtracting weights from the wire, the horizontal feed of the carriage can be increased or decreased. Travel of the weights from the floor to the top pulley gives a range of 7 in. to the carriage.

The solid-block toolholder, in fig. 2, is rigidly fastened to the compound, and is designed to hold the tool so that its edge forms a right angle with the direction of tool travel and the axis of the steel bar undergoing test. As shown, clamp bolts hold the tool, pressing it against a wedge which rests against the tapered groove bottom.

As a result of this taper and wedge, the tool may be adjusted quickly, thereby putting the cutting edge at the same height as the center line of the test bar. The toolbit is ¾ in. square high-speed steel. Angles on the tool are 12° for rake and side clearance. Mounted directly back of the toolholder a dial-gage fixture measures the distance from the top of the tool post to the cutting edge of the tool. This tool position is constant for all tests.

A sample of bar stock to be tested is mounted in a collet chuck, which takes all sizes up to 1½-in. diam. In general testing practice, however, the check is made on a ⅞-in. diam piece.

Standard test norm is 377 rpm's at 81 lb tool pressure and 0.003 in. of feed per revolution. As greater or less weight is applied to increase or decrease the pressure, a corresponding change in the machinability index is found. Usual practice calls for making about 10 test runs on each batch of steel.

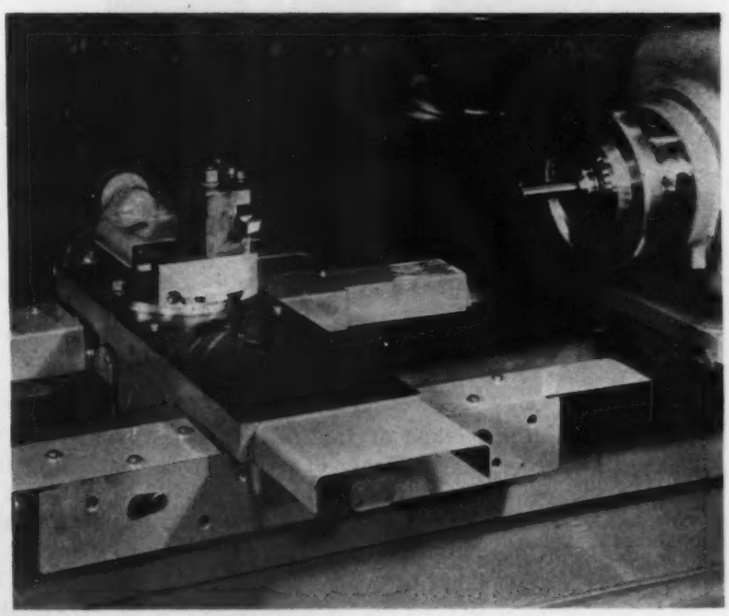


FIG. 2—Close-up of special toolholder that permits adjustment of tool by taper and wedge so that cutting edge forms right angle with axis of test piece and direction of tool travel.

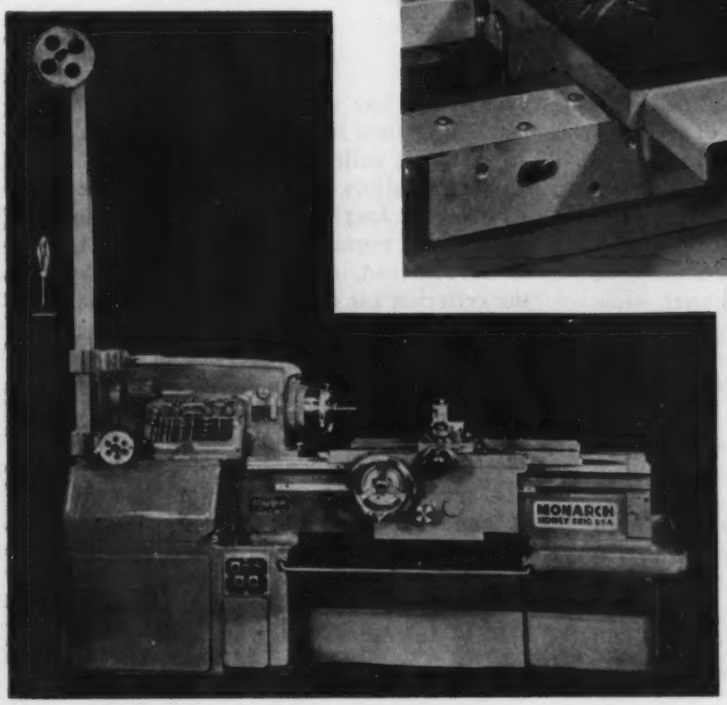


FIG. 1 — Overall view of Monarch machinability-testing lathe equipped for use in a constant-pressure lathe test for measuring machinability of free-cutting steels.

Selection of Forging

By J. J. SLOAN and L. R. DENNY,
Production Design Engineers,
North American Aviation, Inc.

SUMMARY: Current aircraft demands focus attention on methods of fabrication. Especially in fittings, the designer must choose between machined, cast, extruded or forged parts. In the experimental airplane, cost is secondary to time, and it is faster to machine fittings from bar stock. In production design, economy is important. This article weighs forging against other methods as a fabrication method in function, design and cost.

SELECTION of a method of fabricating is frequently governed by either of two factors, time or cost. In the production of prototype aircraft, time is usually the primary factor, whereas on a production order, cost is important. Current demands for aircraft bring the selection of fabricating methods more and more into the hands of the designer, especially in the fabrication of fittings where machining, casting, extruding or forging are available. In production design, economy must be taken into account and it must be decided whether time shall be spent on pattern making, die sinking, or machining, depending upon the number of pieces to be made. Forging, as against other fabricating methods, has been studied by North American Aviation, Inc., from the standpoints of function, design and cost.

Hand forgings, as applied to the aircraft industry, refers to both block shapes, fig. 1, and those with a shape roughly outlining the finished part, fig. 2. Hand forgings are selected over rolled bar stock usually because of the machining time involved. A comparison of the strengths of rolled bar and hand or die forged aluminum alloys shows the rolled bar to be stronger in longitudinal properties. However, some parts require large portions of the bar to be removed, and machining cost becomes the criterion for choosing a hand forged rough shape over rolled bar stock. In so doing, there are obtained better properties in heavier sections. The basic price of a hand forging is changed from "per lb" to "per piece" where the shape requires a lot of hammering or exceptionally large equipment. Size and quantity are determining factors in the selection of hand forgings, compared to die forgings, since the latter are relatively costly for large sizes where only a few are needed.

In dimension, hand forged block shapes are held to tolerances, for thickness, as close as $\pm 1/16$ in., while length and width tolerances are somewhat greater. To obtain the final shape

as a Method of Fabrication

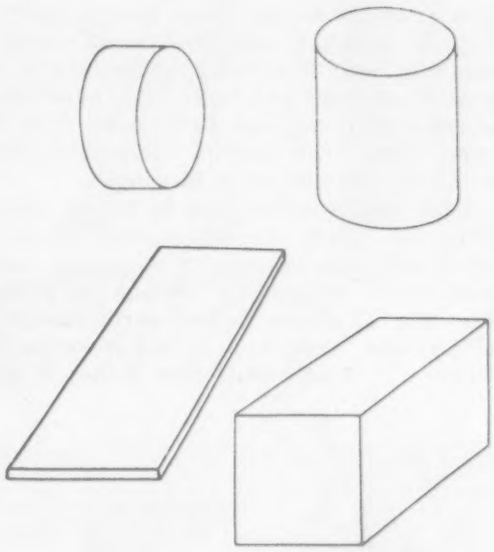


FIG. 1—Hand forged block shapes.

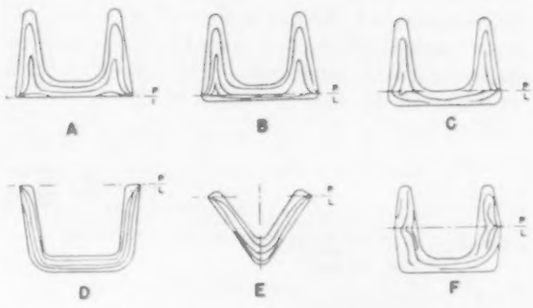


FIG. 3—The effect of parting line on grain direction in forging.

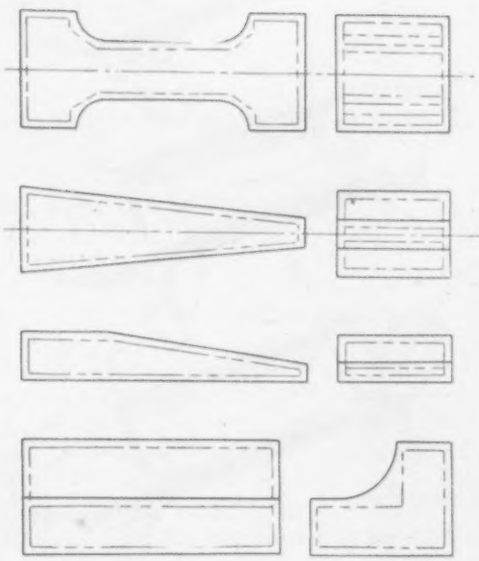


FIG. 2—Typical hand forged rough shapes.

of the fitting, the hand forging may be either milled or Keller machined.

Die forgings are generally preferred to castings or extrusions because of their high strength/weight ratio. Good design of a forging is essential, and through good design, forgings can be made economically and have excellent functional properties. The cost of a forging must include its pro-rated tool cost, price per piece as supplied by the forging vendor, and the labor and machine time in completing the piece. Examples comparing these factors are given in table I.

In selecting the material for die forging, the data in table II, strength/weight ratios, are useful, and are based on the tensile yield strength of 14S-T aluminum alloy as 100 pct.

In the operation of closed dies, the parting line illustrated in fig. 3, is important, since excess metal makes its exit at the parting line. Fig. 3 shows the effect on grain direction and strength of placing the parting line at various

positions on a channel section. By placing the parting line as at fig. 3A, a cheaper die can be made, since machining of the impression is done in only one die block. When placed as in fig. 3F, the parting line is in the least desirable position because of grain direction.

Steel forgings are best designed with impressions in both die halves, but with most of the projection into the upper half. Scale will drop out of the upper impression and may be blown away from the work, and a slight impression in the lower half will assist in locating the metal for forging.

Die costs depend on the size of the die and the amount of machining required to sink it. In buying forgings by the piece, the original die cost is submitted as tool cost and must be pro-rated over the number of pieces purchased. Maintenance of the die is figured into the "per piece" price, since dies sometimes require replacement over long runs. The effect of parting lines on die cost is shown in fig. 4.

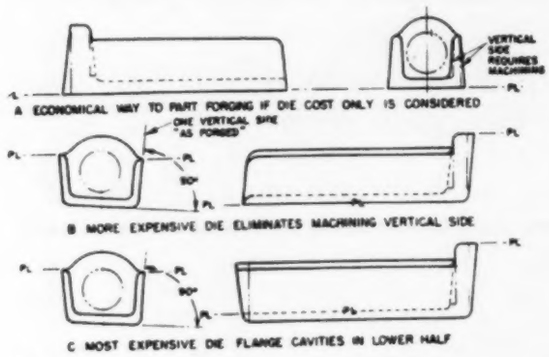

VERTICAL SIDE REQUIRES MACHINING
A ECONOMICAL WAY TO PART FORGING IF DIE COST ONLY IS CONSIDERED
ONE VERTICAL SIDE "AS FORGED"
90°
B MORE EXPENSIVE DIE ELIMINATES MACHINING VERTICAL SIDE
C MOST EXPENSIVE DIE FLANGE CAVITIES IN LOWER HALF

FIG. 4—Methods of placing the parting line to reduce die costs.

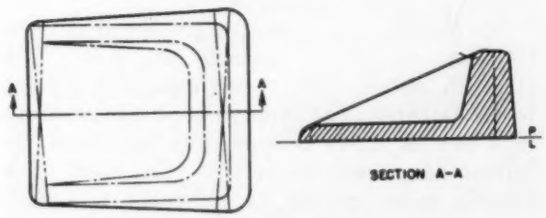


FIG. 5—Neutral forgings from which left and right hand parts can be machined.

Where left and right hand parts are similar, consideration should be given to making each part from a neutral forging. This can be done by leaving extra material for face cuts at different angles, as in fig. 5, or by forging a profile such that each left or right can be made by lopping off opposite arms, as in fig. 6. Another technique is to make a composite forging, such as shown in fig. 7, from which four different parts can be made.

Forgings are sometimes made with both right and left hand parts in the same die, to better balance the die, as in fig. 8, or to obtain better material flow in thin flanges of separate parts, as in fig. 9. The saw cut and machining that follow later reduce the web thicknesses to required dimension with better grain direction than obtainable by forging singly. Fig. 10 shows a forging that includes left and right hand parts. Either could be forged with the line bisecting the angle between the flanges, parallel to the press ram travel. Because of this acute angle and its effect on the die life, it is better to forge left and right together with only 14° between two corresponding flanges, thereby increasing the usage of the die.

Draft angle is as important as parting line since it affects die shape and cost. A draft of 5° to 7° is usually required on all forgings and, with large fillet radii, add weight to the part. If all draft and large fillets must later be removed, it may not be economical to die forge. Also, draft usually necessitates spotfacing for bolts or other fasteners.

A few simple sections can be forged with 7° draft and ironed into shape with no draft. Other parts can be adapted so that no draft is necessary by properly placing the parting line. Fig. 11 shows various parts positioned in their dies, items A, B, C, and D having the required 7° draft, while item E has a back

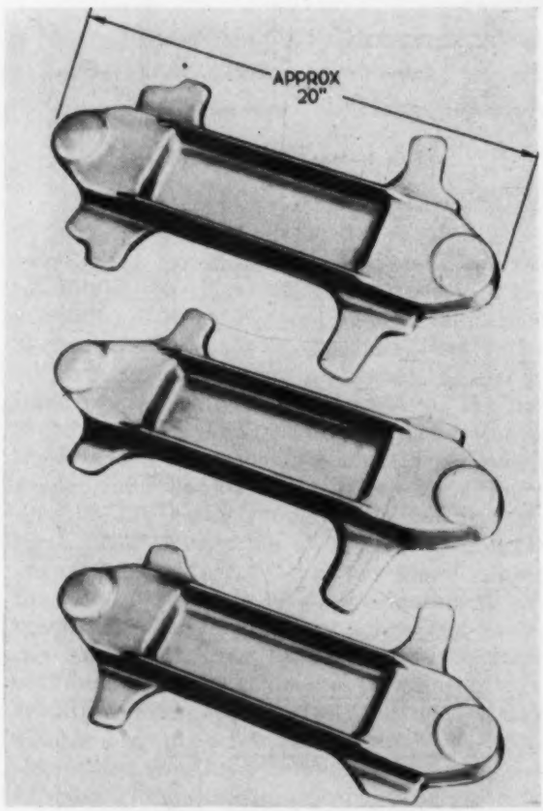


FIG. 6—Left and right hand parts made by cutting off projections.

draft. Actually the 14° draft shown permits ejection of the part from the die and may be removed by machining. In fig. 11F, a locked die is shown, so called because upper and lower halves are mated in vertical alignment by a tongue and groove arrangement. This is a more expensive die but expense must be balanced against the machining factors of the part, and in some cases such an arrangement is least expensive.

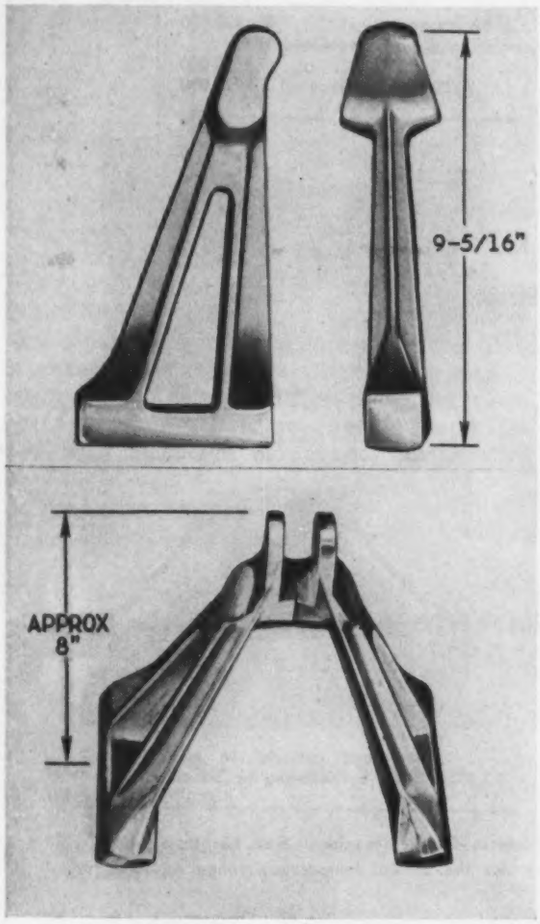


FIG. 7—Composite forging for making four separate parts.

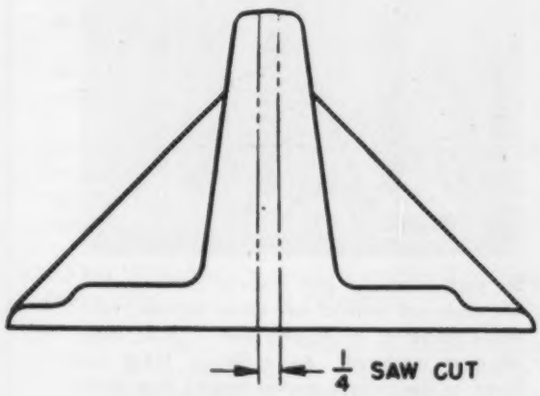


FIG. 9—Siamese forging to obtain better material flow in thin flanges.

The increase in cost of dies that forge without draft or with back draft may be from 20 to 50 pct. Construction of locked dies may increase the cost 100 pct over other types.

Some parts are more adaptable to extrusion than to forging. The important point is die cost, since extrusion dies are cheaper than forging dies. Here again, machining on the part must be considered, but extrusions are generally much cheaper than forging in small quantities. Fig. 12 shows various shapes that may be better cut from extrusions. Fig. 12A had less finish machining cost since the part was extruded without the draft on top and bottom sides of the flanges.

If the cost of a given forging die is known and pro-rated over the number of pieces to be produced, and final machining cost is added, this price per piece can be fairly accurately compared to the price for machining a part out of bar stock or forged billet. Unfortunately, time is sometimes an unfavorable factor and many parts have been machined to shape to meet the schedule for the first few airplanes built while forging dies are being made. Part of the savings through the use of forgings is thus lost.

Each fitting differs from all others in some respect and each requires a definite quantity

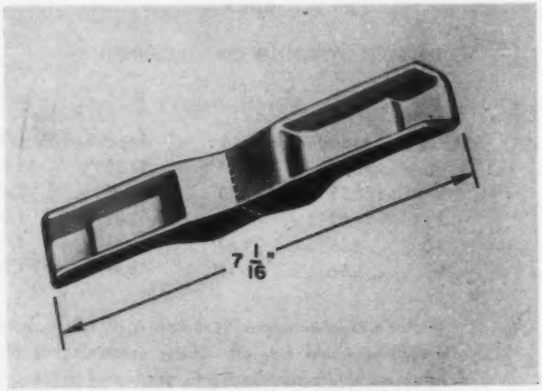


FIG. 8—Siamese forging of left and right hand parts.

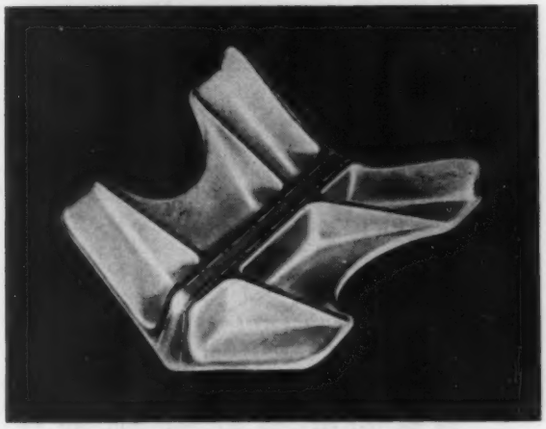
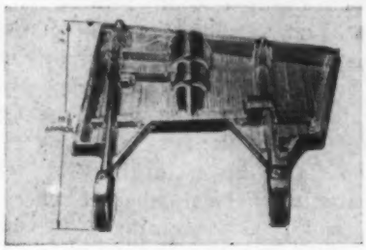


FIG. 10 — Left and right hand parts forged together to eliminate back draft.

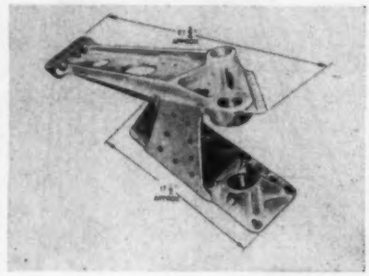
TABLE I

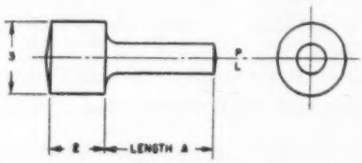
Cost Comparisons of Forged and Machined Parts



Die cost, left and right hand parts $20,000
Ten left and ten right hand parts machined to shape 20 000
Savings by forging for a 100 ship contract..... 75,000

Two SAE 4340 steel forgings welded together. Time and material to make seven left and seven right hand parts by machining equals die cost. Savings by forging 33 left and 33 right hand parts $52,000

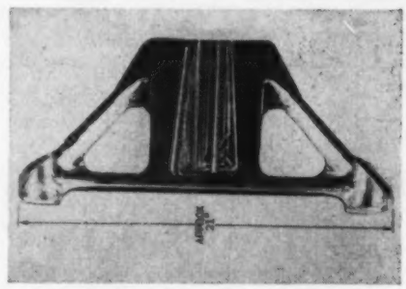




STEEL FORGING OR MACHINED BAR

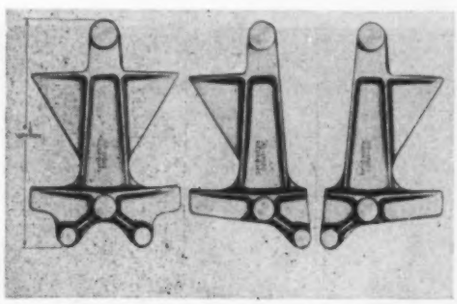
Cost per Piece

Length	100 Pieces		200 Pieces	
A, In.	Machined	Forged	Machined	Forged
1	$2.50	$3.71	$2.30	$3.15
2	3.25	4.13	3.05	3.43
3	4.02	4.48	3.82	3.81
4	4.66	4.83	4.46	3.98
5	5.54	5.18	5.34	4.26

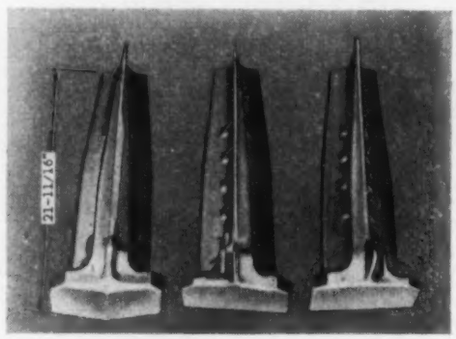


Time and material to make 17 pieces by Kellering equals die cost.

If made of aluminum with length A of 7 in., about 1000 pieces could be machined from bar stock before a die forging would pay off. Easier machining of aluminum plus the critical temperature range required for forging aluminum contributes to the higher piece price.



From this composite forging, either right or left hand parts can be made. By using a single forging die, $870 was saved. The slight additional cost of machining and material is less than 25 pct of the die cost pro-rated over each part over the present quantity of parts.



Six parts machined plus material cost, equalled die, setup and material cost for six forgings. Parts made thereafter by forging cost 1/16 as much as those machined. An additional $1400 was saved by designing a neutral forging from which both left and right hand parts could be made.

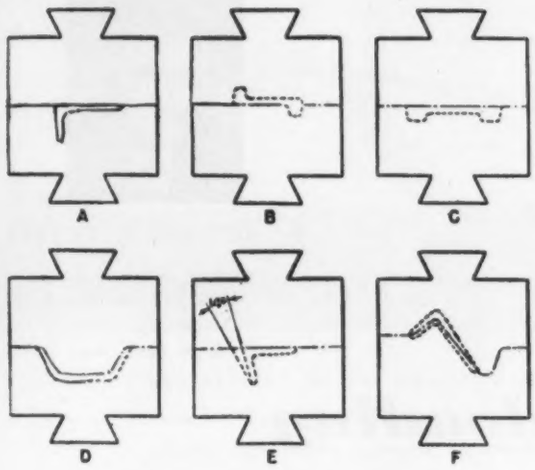


FIG. 11 — The effect of draft angle on die design.

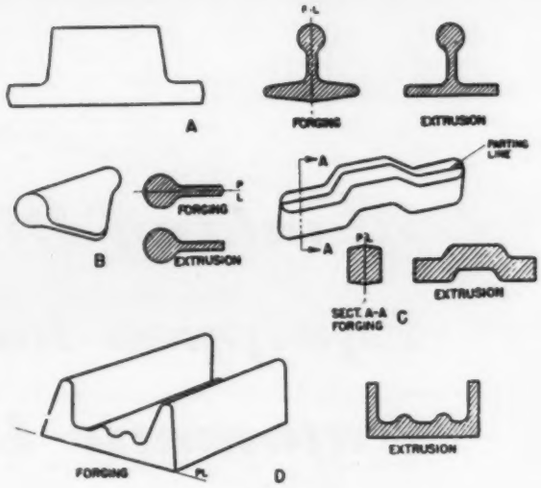


FIG. 12 — Shapes that should be less expensive if extruded.

as the break-even point, where the forging becomes more economical than a machined part. In general, the larger the fitting, the greater the forging die cost; but, by the same token, fewer forgings will be required to match die cost with machined part cost. Comparative appraisals of the quantity required to break even, as well as economical design considerations, should be obtained if border line cases occur. Table I illustrates several parts and shows cost comparisons of forging and machining.

TABLE II

Comparison of Strength-Weight Ratios of Various Forged Metals
14S-T = 100 Pct

		Approximate Strength/Weight Ratio, Pct
14S-T Aluminum Alloy Spec. QQ-A-367 Class 5	Standard high strength aluminum forgeable alloy. Not to be welded.	100
***75S-T Aluminum Alloy Spec. AMS4139**	Not as easily forged as 14S-T. Highest strength aluminum alloy. Not to be welded.	128
0-1 Aged Magnesium Alloy, Spec. AN-M-21	Where rigidity by mass is required. Because of susceptibility to corrosion, each application requires careful consideration. Not to be welded.	54
Hardened and Tempered SAE 4130, 4140 and 4340 Alloy Steel	Used where temperatures are greater than allowable for aluminum or where space is limited or bearing loads require high strength material. Can be welded.	60 to 125
SAE 1020 Carbon Steel, Normalized	Used where case hardening is necessary for wear and for small lightly stressed parts. Strength/weight ratio based on Normalized forgings. Can be welded.	26
Corrosion Resisting Steels, AISI 321 and 347, and Super-Alloy Steels, Annealed	Used where corrosion resistance and strength at elevated temperatures are required. Can be welded.	21
356 and 195 Aluminum Casting Alloys	Used for intricate fittings where forging strength is not required. 195 alloy is non-weldable.	42

** Use of 75S is limited to designs approved by the Chief Project Engineer at North American Aviation. Factors present in the forging of any aluminum alloy are more critical with 75S and the process must be more closely controlled.*

Blanking Dies Equipped for Automatic Unloading

By ARTHUR R. EULITZ

Assistant Superintendent,
Tools and Die Div.,
Studebaker Corp.,
South Bend, Ind.

THE blanking of sheet steel for automobile fenders, hoods and similar large parts that are later stamped or drawn is an operation that, while rapid, requires as many as four men per press. An operator and a helper load the sheet stock and trip the press, and two helpers unload the blanked parts and the scrap.

Mechanical handling devices can pick up and shift blanks onto a pallet, but such devices are bulky and expensive. A method of accomplishing the same results at moderate expense has been developed by Studebaker Corp. An air-operated ejector is applied to the blanking die so that the blanked parts are tilted and slide by gravity over balls and rollers, automatically stacking on a pallet set on the discharge side of the press.

No help is needed to remove blanked parts from the press, thus saving the time of two men in the case of large blanks and one man for smaller parts. Loading is done as before, using two men for large sheets and one on smaller sheets, but the labor is minimized by spotting the pallet of sheet stock so that sheets are slid into place in the die with little or no lifting, as shown in fig. 1. After about a dozen blanks are produced, the operator removes the scrap cut away from these blanks and throws it into tote boxes provided for this purpose.

For discharging the blanked parts, the ejector arrangement has transfer balls and cloth rollers to avoid scratching the blanks. When the ejector is tilted by an air cylinder inside the die, the blank is inclined to an angle of about 11 deg, and moves by gravity down over the balls and rollers, out of the press and onto the pallet set on the floor to receive it. Details of the ejector are shown in fig. 2. This particular ejector is installed on a press used for blanking out parts for automobile hoods.

The ejector includes levers fastened on one end to a shaft arranged to rock in bearings. A longer lever, which does the ejecting, has a pin at its outer end and this pin, sliding in a slot of an ejector pad, causes the ejector pad to lift the

FIG. 1—Steel sheets for blanking are loaded on pallets that are work-level high to eliminate lifting in press loading.

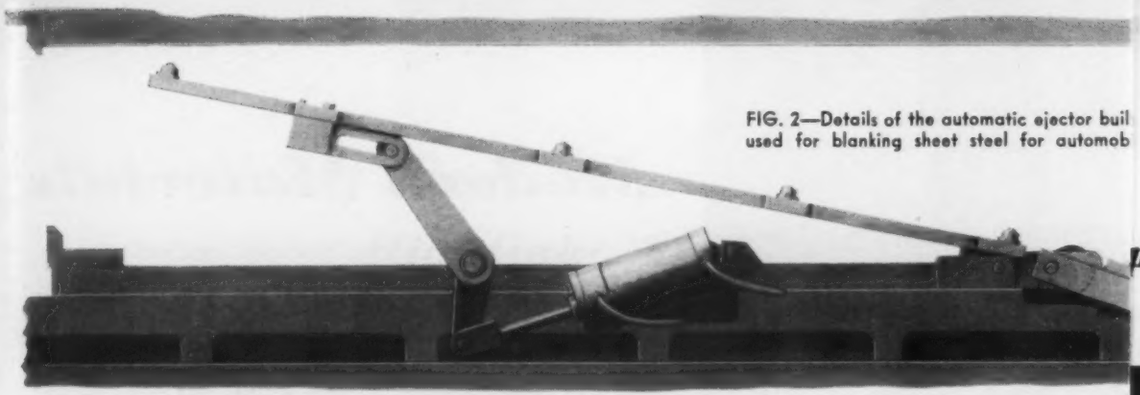


FIG. 2—Details of the automatic ejector buil
used for blanking sheet steel for automob

SUMMARY: An air operated device which tilts sheet metal blanks and causes them to slide out of the press and onto special tote pallets on which they stack without handling is described in this article. The device is economical to build and eliminates the labor of press unloading.

blank when the lever is rocked upward. Dotted lines in fig. 2 indicate the position of the pad when it is elevated to tilt the blank to an angle of 11 deg.

A short rocking lever, pinned to the same shaft as the longer lever, is pivoted at its outer end to the plunger of a Miller air cylinder with a 4-in. bore. This air cylinder is pivoted at the other end so that it can rock.

When air is admitted to the back end of the cylinder behind the plunger, the plunger moves out 4½ in. and lifts the ejector. Admitting air to the other side of the plunger rocks the ejector back into the recess in the die, at which time all operating parts of the ejector are below the die parting.

When the die is installed in the press, air lines leading to the cylinder are connected to a solenoid operated valve. The solenoid actuates the valve when the ram of the press closes a limit switch near the top of the upstroke of the ram. As the valve is tripped, the air plunger operates the ejector and the blank slides out of the die.

Before the press operator loads the next s
the air valve is reversed, admitting air to
return end of the cylinder and lowering
ejector so that the sheet can be inserted in
die. Then the press is tripped, closing the
and shearing the blank. As the die opens
the ram goes up, the ejection cycle is repe

The blanks move down the rollers onto
pallet where vertical stakes on the pallet a
stops against which the forward edges of
blank strike, stopping its motion and allo
the blanks to stack themselves as shown in

The ejector-unloader built to the describe
sign is moderate in cost and need only be
nected by flexible hose to the valve and air
of the plant when the die is installed in the
The cost is rapidly offset by lavor savings.
is plenty of room inside the cutting edges
large blanking die for the air cylinder an
holes in the press bed are required. Dies o
type used by Studebaker are installed on
blanking presses, but could be used on any
blanking press.

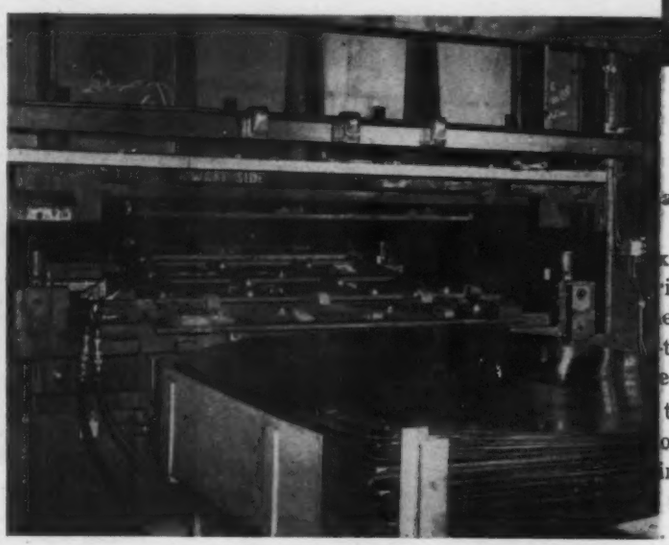


FIG. 3—The upstroke of the press ram trips limit switches that actuate the die unloading mechanism. Shown here is the unloading mechanism tilted to unloading position. During the blanking cycle, the mechanism falls below the parting line of the die.

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Blanking Dies Equipped for Automatic Unloading

By ARTHUR R. EULITZ

Assistant Superintendent,
Tools and Die Div.,
Studebaker Corp.,
South Bend, Ind.

THE blanking of sheet steel for automobile fenders, hoods and similar large parts that are later stamped or drawn is an operation that, while rapid, requires as many as four men per press. An operator and a helper load the sheet stock and trip the press, and two helpers unload the blanked parts and the scrap.

Mechanical handling devices can pick up and shift blanks onto a pallet, but such devices are bulky and expensive. A method of accomplishing the same results at moderate expense has been developed by Studebaker Corp. An air-operated ejector is applied to the blanking die so that the blanked parts are tilted and slide by gravity over balls and rollers, automatically stacking on a pallet set on the discharge side of the press.

No help is needed to remove blanked parts from the press, thus saving the time of two men in the case of large blanks and one man for smaller parts. Loading is done as before, using two men for large sheets and one on smaller sheets, but the labor is minimized by spotting the pallet of sheet stock so that sheets are slid into place in the die with little or no lifting, as shown in fig. 1. After about a dozen blanks are produced, the operator removes the scrap cut away from these blanks and throws it into tote boxes provided for this purpose.

For discharging the blanked parts, the ejector arrangement has transfer balls and cloth rollers to avoid scratching the blanks. When the ejector is tilted by an air cylinder inside the die, the blank is inclined to an angle of about 11 deg, and moves by gravity down over the balls and rollers, out of the press and onto the pallet set on the floor to receive it. Details of the ejector are shown in fig. 2. This particular ejector is installed on a press used for blanking out parts for automobile hoods.

The ejector includes levers fastened on one end to a shaft arranged to rock in bearings. A longer lever, which does the ejecting, has a pin at its outer end and this pin, sliding in a slot of an ejector pad, causes the ejector pad to lift the

FIG. 1—Steel sheets for blanking are loaded on pallets that are work-level high to eliminate lifting in press loading.

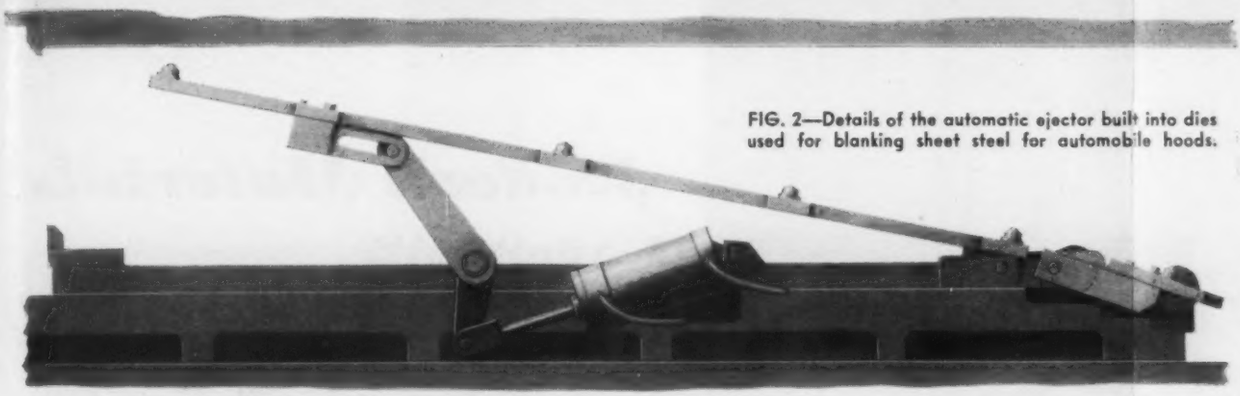


FIG. 2—Details of the automatic ejector built into dies used for blanking sheet steel for automobile hoods.

SUMMARY: An air operated device which tilts sheet metal blanks and causes them to slide out of the press and onto special tote pallets on which they stack without handling is described in this article. The device is economical to build and eliminates the labor of press unloading.

blank when the lever is rocked upward. Dotted lines in fig. 2 indicate the position of the pad when it is elevated to tilt the blank to an angle of 11 deg.

A short rocking lever, pinned to the same shaft as the longer lever, is pivoted at its outer end to the plunger of a Miller air cylinder with a 4-in. bore. This air cylinder is pivoted at the other end so that it can rock.

When air is admitted to the back end of the cylinder behind the plunger, the plunger moves out 4½ in. and lifts the ejector. Admitting air to the other side of the plunger rocks the ejector back into the recess in the die, at which time all operating parts of the ejector are below the die parting.

When the die is installed in the press, air lines leading to the cylinder are connected to a solenoid operated valve. The solenoid actuates the valve when the ram of the press closes a limit switch near the top of the upstroke of the ram. As the valve is tripped, the air plunger operates the ejector and the blank slides out of the die.

Before the press operator loads the next sheet, the air valve is reversed, admitting air to the return end of the cylinder and lowering the ejector so that the sheet can be inserted in the die. Then the press is tripped, closing the die and shearing the blank. As the die opens and the ram goes up, the ejection cycle is repeated.

The blanks move down the rollers onto the pallet where vertical stakes on the pallet act as stops against which the forward edges of the blank strike, stopping its motion and allowing the blanks to stack themselves as shown in fig. 3.

The ejector-unloader built to the described design is moderate in cost and need only be connected by flexible hose to the valve and air lines of the plant when the die is installed in the press. The cost is rapidly offset by lavor savings. There is plenty of room inside the cutting edges of a large blanking die for the air cylinder and no holes in the press bed are required. Dies of this type used by Studebaker are installed on Bliss blanking presses, but could be used on any large blanking press.

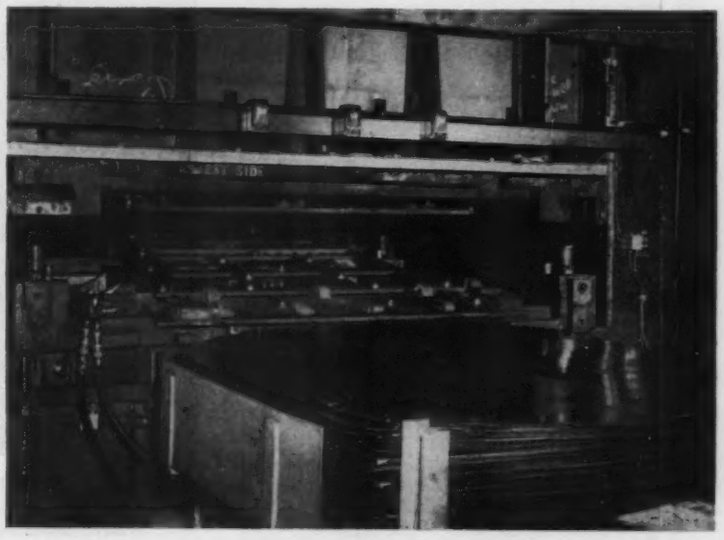


FIG. 3—The upstroke of the press ram trips limit switches that actuate the die unloading mechanism. Shown here is the unloading mechanism tilted to unloading position. During the blanking cycle, the mechanism falls below the parting line of the die.

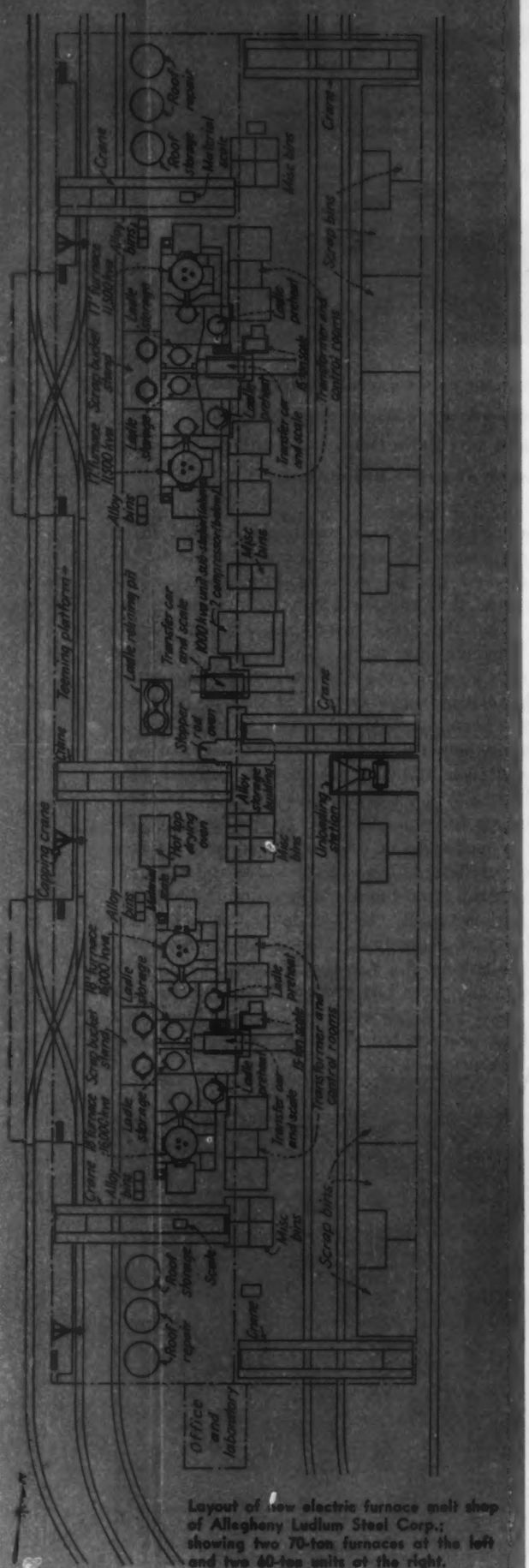
Modern Materials

STEEL producers, facing unavoidable cost increases in labor and materials, are focusing new attention on the possibilities of cost savings through improved materials handling techniques.

Typical of this trend is the new electric furnace melt shop at the Brackenridge, Pa., plant of Allegheny Ludlum Steel Corp. The layout of this shop is designed to provide optimum efficiency in material handling, as the accompanying illustrations emphasize.

The four Swindell top-charge furnaces are the focal point of the layout, with practically a straight line flow provided from raw materials to poured ingots.

Highlights of the new Allegheny Ludlum shop.

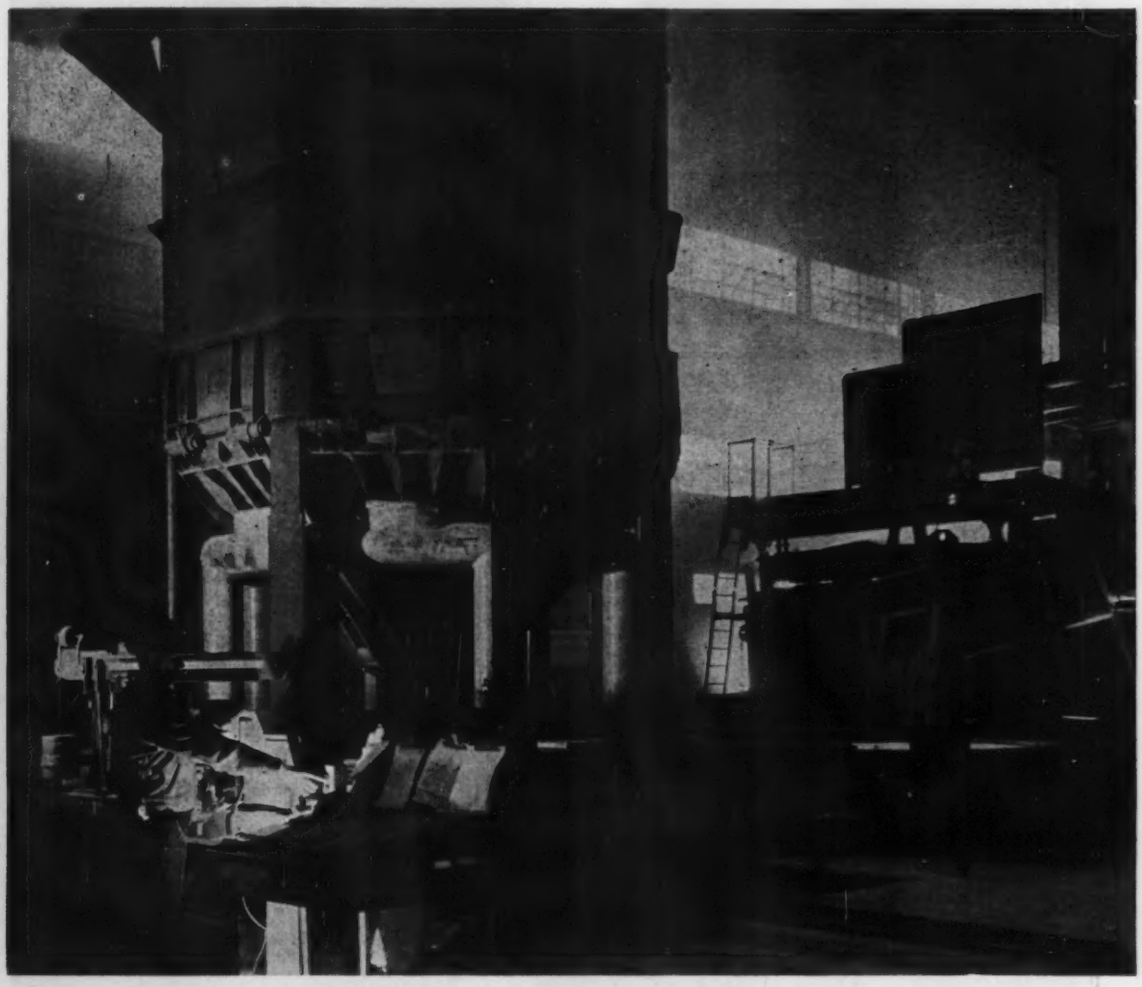


Layout of new electric furnace melt shop of Allegheny Ludlum Steel Corp.; showing two 70-ton furnaces at the left and two 60-ton units at the right.

Scrap is loaded into charging buckets directly from cars when possible, thus eliminating an operation. Scrap bins are located adjacent to siding.

Handling Techniques

Highlight AL's New Melt Shop



Weighing and transferring loaded charging bucket from raw materials side of building to melting aisle is a one-man operation. Here bucket is being weighed as it is transferred via a winch arrangement controlled by pushbuttons.

which was designed by Swindell-Dressler Co. and erected by John F. Casey Co., Pittsburgh, are illustrated in the accompanying photographs.

Analyzed cars of scrap are shifted into the electric furnace building for unloading into selective bins running the length of the shop. This gives an ample supply of scrap under roof and protected from the elements. Charging buckets are loaded directly from the railroad cars when possible.

Electrodes, refractory brick and hot tops are palletized to minimize handling and breakage. Electrodes are palletized by the supplier in units of nine. Ferrosilicon arrives at the shop in railroad drop-bottom containers for fast and easy unloading.

Elevated storage bins are used for fluxes, ferroalloys, and furnace hearth repair material. Three 125-ton cranes are available on the melting side, and one of 110-ton and two of 25-ton capacity are located on the raw materials side.

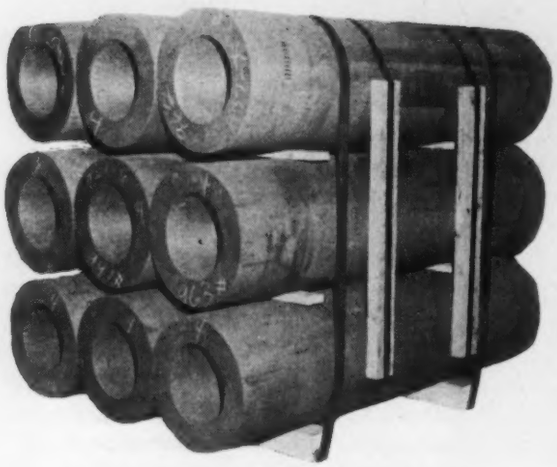
After a loaded charging bucket is weighed, the bucket stand can be moved immediately into position for crane lift on melting aisle of building. Faster charging with swing-top furnaces has resulted in considerable reduction in heat times.

Charging a furnace. Two to three buckets are charged for each heat, depending on type of scrap used.

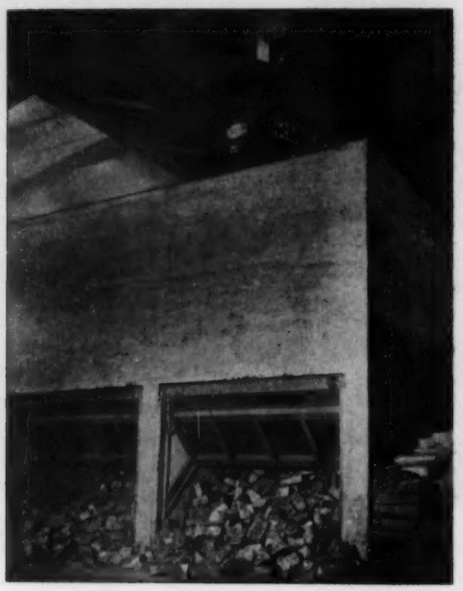
Limestone is transferred from cars to storage bin in background by a 1¾ cu yard clamshell. Plans call for installation of a conveyer for moving the limestone to storage bin. The four sectioned storage bin also handles burnt lime, manganese and dolomite.

Limestone is transferred from the bin to the special flux box by a Shoveloader. This unit finds wide use in other bulk handling jobs around the shop.

Ferrosilicon arrives at the plant in railroad unit containers which are unloaded directly into storage bins to eliminate a handling operation.



Electrodes are received on a pallet to simplify handling and minimize damage. Photo courtesy International Graphite & Electrode Corp.



RECOVERY OF MANGANESE from low grade ores

ABOUT 1.6 million tons of manganese, principally as ferromanganese, spiegeleisen and silicomanganese, is used annually in the United States in the manufacture of steel, both as a deoxidant and as an alloying element. Although this country possesses large reserves of low grade manganese ores, deposits suitable for direct smelting to ferromanganese are scanty. Certain of these ores yield concentrates of ferro grade by mechanical beneficiation, but most are too lean or impure to justify treatment by present methods.

A process for recovering manganese from low grade ores, recently revealed at the Montreal meeting of the American Institute of Chemical Engineers, by R. D. Hoak and J. Coull, of Mellon Institute and University of Pittsburgh, respectively, involves by leaching with the waste pickle liquor. Commercial acceptance of such a process would not only provide means for recovering manganese from low grade ores, but would also present a method for solving a difficult waste disposal problem. Pickle liquor cannot be discharged to streams because of its pollutional effects. It is not acceptable in substantial concentrations in municipal sewer systems because of its corrosiveness and its interferences with sewage treatment processes. As a result, it must be neutralized or stored in lagoons, and either of these expedients is both costly and wasteful.

This situation is the basis for the development of a process for producing an oxide concentrate low in impurities and containing upwards of 60 pct Mn. The process will yield pure manganese sulfate or chloride where these are the preferred manganese compounds. No liquid waste is produced, and a secondary pollution problem is thereby avoided.

Production of the oxide concentrate involves four principal operations: (1) Ground ore is leached with pickle liquor, and the sulfate solution is separated from the gangue; (2) the sulfate is converted to a chloride solution by treatment with calcium chloride, and the precipitated calcium sulfate is filtered off; (3) the optimum proportion of iron is separated from the pregnant solution by differential precipitation with chalk or pulverized high calcium limestone; and (4) manganese is precipitated from the solution with high calcium lime slurry. The precipitate is filtered off, washed and dried as product, and the calcium chloride solution remaining is concentrated for reuse.

Results of leaching studies established the important fact that grinding finer than —100 +200 mesh is not essential for complete extraction, see fig. 1. Grinding ores to about 60 mesh is a relatively low cost operation, but, as grinding is carried to finer and finer mesh sizes, the cost rises rapidly. Since 98 pct of the manganese can be extracted from 60 mesh ore in only 30 min, finer grinding would not appear to be justified.

The effect of temperature on extraction rate was not studied systematically, but, as might be

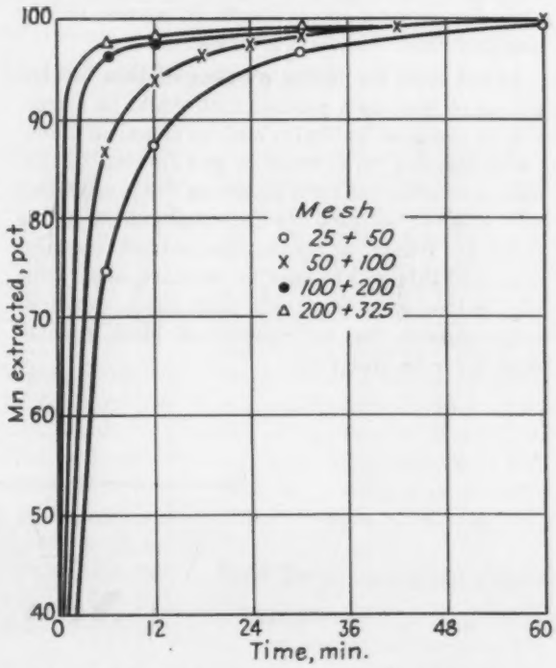


FIG. 1—Efficiency of leaching manganese from a 15 pct ore.

expected, the rate of reaction increases with temperature. Detailed study of this variable was not undertaken because of the rapid rate of reaction at room temperature. Where it is desirable to increase the reaction rate by raising the temperature, the higher temperature can be attained without supplemental heat by using the pickle liquor promptly after it is discharged from the picklers, where its temperature is 180° to 220°F.

Where it is desired to recover manganese in a

form adapted to the manufacture of ferromanganese, it is desirable that the product be substantially free from sulfur. It is not possible to precipitate manganese from a solution of its sulfate with a cheap alkaline material, e.g., lime, because the coprecipitated calcium sulfate would contaminate the product. This difficulty can be largely overcome by converting the sulfates in the solution to chlorides, and can be accomplished readily by treating the extract with a solution of calcium chloride.

Where the objective of the process is the preparation of pure manganous sulfate (or chloride), complete separation of iron from the extract liquor is essential. Where the objective is the recovery of manganese oxides for manufacturing ferromanganese, the concentrate should contain not less than 50 pct Mn. and the manganese: iron ratio should not be less than 9:1. Complete separation of iron is not necessary in this case, but the degree of removal will be a function of removal cost v. value of product. Premiums are paid for manganese contents in excess of the minimum specified for any grade.

It has been the major purpose of this investigation to provide a process that would be attractive to the steel industry, and, as chemical manufacturing, per se, is more or less foreign to that field, emphasis has been placed on the preparation of a product suitable for ferromanganese manufacture. Where a manganese extract contains iron, and this will usually be the case, separation of the iron as a relatively pure oxide would be advantageous for enrichment of blast furnace dust prior to sintering.

In distinction from the recovery of manganese oxide for ferromanganese manufacture, if manganese sulfate, or chloride, is the desired product, the iron must be removed completely from solution before crystallization of the salt. Manganese sulfate can be prepared in a state of high purity by treating the clear extract from the gangue filter with sufficient calcium carbonate, as described above. Manganous chloride can be similarly prepared by precipitating the iron from the filtrate from the chloride conversion step. The relatively high value of these salts permits a substantial loss of manganese in the iron removal operation without significantly affecting the economics of the process. If an appreciable amount of manganese were precipitated with the iron hydrate, it could be recovered by recycling the precipitate.

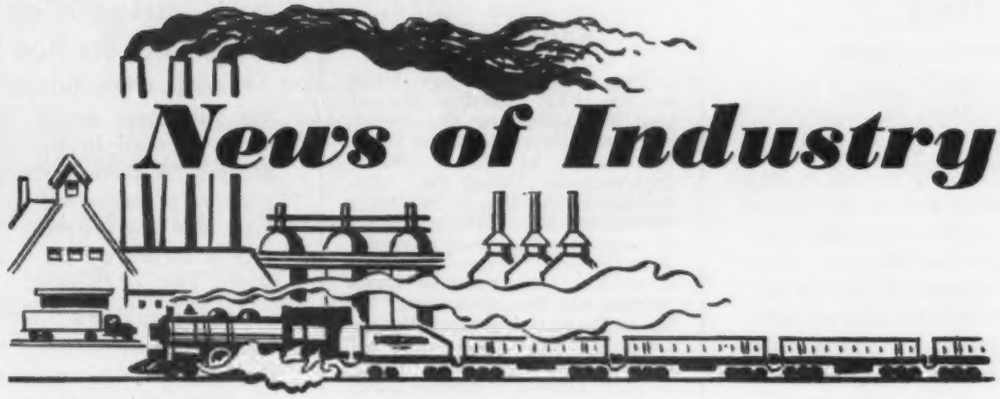
The process has been designed to operate partly continuously and partly on the batch basis. Duplicate reaction tanks can be provided, to be charged alternately, on a 1-hr cycle. Each tank would then discharge alternately to the respective filter, which would operate continuously. This is a flexible design that would permit adjustment of cycle-time to reaction rate. Although the process could probably be operated wholly continuously, a confident design could be evolved only on the basis of further pilot studies. The design suggested has the merit of compactness, simplicity, and relatively low cost.

An investigation of the leaching reaction has shown that ferrous sulfate solution will dissolve substantially all of the manganese from a low grade oxide ore in less than an hour. It has also been shown that fine grinding of the ore is not necessary; grinding to about 60 mesh is adequate for efficient extraction. It has shown further that it is not necessary to mill the ore and leach liquor; thorough mixing is alone required.

New Books

"*Apprentice Training Standards.*" Compiled by the NMTBA Committee on Apprentice Training, the book is a working manual for setting up and conducting a long-range apprentice training course. It specifies in detail the nature of work to be done by the apprentice, and contains samples of forms required, including the application for apprenticeship, the apprenticeship agreement, and the work records required. Included is a bibliography on machine tool practice and apprentice training. National Machine Tool Builders' Assn., 10525 Carnegie Ave., Cleveland 6. $2.00.

"*Neue Erkenntnisse und Entwicklungen beim Schweissen von Eisenwerkstoffen*" (New Knowledge and Developments in Iron Smelting), by Karl Ludwig Zeyen. The book presents developments of recent years in furnace and melting techniques for iron and steel as performed in Germany and other European countries. Also included are sections on flame and electric cutting, electrodes, and underwater work. Carl Hanser Verlag, Leonhard-Eck-Strasse 7, München, Germany. 10.80 German Marks with paper cover, 12.80 marks leather bound. 214 p.



Oops, Sorry!

Pittsburgh — It didn't take some steel buyers long to go over the new extras and find a hole big enough to drive the proverbial truck through. Buyers of cold-rolled sheets in tinplate gages and sizes discovered almost immediately that they could buy manufacturing ternes or 0.25-lb electrolytic tinplate for less—and get a coated product and a die lubricant to boot.

It all came about because mills had figured sheet costs on a sheet mill basis and tinplate costs on tinmill practice. So last week the corresponding cold-rolled sheet extras were dropped into line. The average reduction was about $6.00 a ton.

U. S. Steel Stockholders to Vote

New York—The board of directors of U. S. Steel Corp. have called a special meeting of the stockholders of the corporation to vote upon proposed plans for employee pension and insurance benefits.

The meeting will be held Monday, Feb. 27, and stockholders of record on Jan. 20, 1950, will be entitled to vote.

USSR, Finland Sign Trade Pact

Washington — A recent trade agreement between the USSR and Finland calls for the USSR to receive pig iron, steel, chemicals and other commodities in return for optical and precision instruments.

Auto Men Learn New Ways to Cut Costs

Cut wire shot possibilities hailed . . . New welding, polishing ideas are intriguing . . . Automatic transmission talks pack house at SAE 1950 meeting—*By WALTER G. PATTON*

Detroit—Fuel consumption, automatic transmissions and new ways of achieving production economies are a few of the subjects automotive engineers discussed here last week at the 1950 meeting of the Society of Automotive Engineers.

The Horning Memorial Medal was presented to T. A. Boyd for his work on antiknock fuels. At the annual dinner, Gen. J. Lawton Collins, Chief of Staff, U. S. Army, made a strong plea for continued and increased cooperation of civilians in military affairs. He emphasized the dependency of the armed forces on the automobile industry.

Zeder Elected President

James C. Zeder, chairman of the engineering board, Chrysler Corp., was elected president of SAE for 1950. He conceived and stimulated organization of the SAE war engineering board, a major service agency of the armed forces during World War II.

As might have been predicted, automatic transmissions stole the show. Papers describing the new Chevrolet and Studebaker transmission units were presented in a packed Book-Cadillac ballroom, with standees around the walls and overflowing into the balconies.

The GM new process activity which is destined to be a major department in the new technical center was described by R. J. Emmert, director of the facilities and processes staff. Telling of some of the achievements of his staff, he said that consumption of cut wire shot for cleaning in the Cadillac

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Ford Decentralization Continues

Detroit—Ford's program of decentralization moved another step forward recently when it was announced that operations of the company's Flat Rock, Mich., plant will be moved to Monroe. Monroe was recently acquired from Kelsey-Hayes which continues to use part of the Monroe facilities.

The Ford Flat Rock plant, built in 1923, manufactures head lamps, rear lamps and parking lamps for Ford. Other Ford divisions will be moved to Monroe as space becomes available, according to Ford officials.

Auto Men Cut Costs

Continued on Page 85

foundry had been reduced 49 pct and the cost of cleaning parts was reduced 16 pct by keeping the machines tight during operation and using a timing device that continues to operate the equipment after blasting is stopped. This minimizes the amount of shot carried away with the parts, he said.

Mr. Emmert also said that GM tests show that by using cut wire shot for peening on front suspension springs, fatigue life has been increased from 170,000 cycles to 4,500,000 cycles.

Could Save $500,000

If cut wire shot could be used throughout GM for all peening and cleaning operations it would save the corporation over half a million dollars, Mr. Emmert said. He emphasized, however, that while highly promising, the practicability of using cut wire shot for cleaning, has yet to be proved. It appears to be of particular advantage for cleaning forgings since it would eliminate pickling and solve the problem of disposing of pickling wastes.

The speaker also described a new machine developed by GM for welding ordinary square nuts to sheet metal. The ordinary nuts cost about a third as much as special nuts designed for the purpose, he explained. He also told about a method for polishing parts in a revolving tub containing slightly abrasive material. Both the tub and the part can be made to revolve. While still experimental, the method has been used at Ternstedt on small hardware parts and will be used to copper buff grille bars and to polish a steel surface that will permit plating without any buffing whatsoever. The method lends itself particularly to irregularly shaped parts.

Gas Saving Tricks

The road to economy in gasoline consumption was outlined by R. J. Greenshields of Shell Oil Co., Wood River, Ill., who described the results of the annual "Mileage Marathon." By making adjustments such as blowing the tires up to 110 lb, changing the axle ratio, using very thin lubricants in the crankcase and differential, boosting the compression ratio and removing the fan belt, mileage can go up to better than 50 miles per gal. Further, by accelerating at full throttle to 20 mph and coasting to 5 mph the winning car in this year's contest, a 1947 Studebaker, was able to boost its winning mileage up to 150 miles per gal.

Resume Your Reading on Page 85

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"I'll never forget the time I told the boss off. Trouble is, neither will he."

Inland Takes an Option On Possible Iron Ore Mine Site

Chicago—The Inland Steel Co. has taken an option to lease a large acreage in the vicinity of Steep Rock Lake, Ontario, for the purpose of exploring and developing a new iron ore mine. The property is owned by Steep Rock Iron Mines, Ltd., of Canada.

The Steep Rock Lake's area is located about 120 miles west of Port Arthur in western Ontario. Exploration and development work in the area began in 1937, and shipments of iron ore began in 1944.

Steep Rock Iron Mines is a producer and seller of iron ore, currently shipping from one mine in the area and actively developing another. However, if exploration proves up a large merchantable iron ore body, Inland will develop and operate a mine on the acreage on which it has taken an option.

J. Wood, Auto Engineer, Retires

Detroit—John G. Wood, who has served as chief engineer of the Chevrolet Div. of General Motors Corp., has retired after 43 years in the automobile industry.

Mr. Wood began his career as a draftsman with the old National company. He was associated with General Motors divisions for 6 years before joining Chevrolet in 1933. Recently, he has served as executive assistant for engineering on the staff of T. H. Keating, general manager of Chevrolet.

Hayes Mfg. Doing Packard Work

Detroit—Hoods and fenders for 1951 model Packards will be produced by Hayes Mfg. Co., of Grand Rapids, Mich., it has been disclosed.

Die-making operations have been authorized but no production schedules have been released, according to R. R. Rees, Packard director of purchases.

Some sources have estimated that $2 million worth of Packard business will be placed with Hayes during the next 2 years.

No Boom, No Bust Seen for Steel Forgings

Order volume this year expected to be within 10 pct of 1949 . . . Dollar volume may be greater . . . Companies will pass on steel price increases—*By BILL LLOYD*

Cleveland—A normal year, neither boom nor bust, is shaping up for producers of commercial steel forgings, spokesmen for major segments of the industry said this week.

It is estimated that the industry this year will come within 10 pct of 1949 order volume. Dollar volume of shipments will equal, if not top, last year's figure. A reason for this is the steel price increase, which the industry will pass along.

Salient point of the 1950 outlook is not so much the development of new markets, but the level of activity of present markets.

Automotive demand, including trucks, looks good for the first half, as do farm implements, petroleum equipment, diesel locomotives and aircraft, if the government programs develop as expected.

Backlogs About 3 Months

Average order backlogs in the industry are about 3 months, based on conservative trade estimates. Hold-ups are not numerous. Plenty of releases on orders held up during the final days of 1949 are coming through.

Other developments, less pleasant, include the demands of labor for wage increases, pensions and fringe benefits, and competition, postwar development of which began last summer, and which is expected to grow increasingly keen. A highly competitive battle for existing markets is on. Costs are going to be increasingly important, particularly during the downward swing of volume, when shop personnel give vent to what one forging company official calls the "human instinct to stretch out the work."

Price Testing to Continue

Price testing will continue throughout the year, although the situation at the moment is quiet. Buyers know that the forge shops are not all operating at normal capacity. On the other hand, no cut throat pricing is expected. The industry learned a lot during the war and is more stable than it was 10 years ago.

If the wage demands are met, higher prices are generally considered to be a certainty.

Supplies Are Adequate

A secondary problem as far as customer relationships are concerned, according to one company official, is the lower inventories which many users of forgings are presently carrying. Part of this is the result of the steel strike induced shortages. "What the customer wants us to do," he said, "is turn around on a dime. Changing dies means higher production costs. Customer runs are not as long as they were last year. If the forging operator doesn't want to do it, he's an unreliable source of supply. What many forging buyers demand amounts to an abnormal flexibility of forging production."

Supply of forging quality billets and bars, carbon or alloy, is not expected to be a problem after Mar. 1. Some temporary tightness exists, but unless the government should dump a big aircraft program, for example, suddenly into manufacturers' laps, as was the case in 1949, no difficulties are expected.

Reaction of many producers of forgings to the steel price increase was not altogether happy. This, according to company spokesmen, is not because of the increase itself, which was to be expected. What forgers, like many other consumers, would have liked was to have the increase for orders placed after a certain date, or 6 weeks or two months notice, permitting them to pass it along on work in process or on quotation. With the higher

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"Bilkins! Consider that order I just gave you cancelled."

Inland Stockholders Will Vote on Two Pension Plans

Chicago—Inland Steel Co. has mailed to stockholders notice of a special meeting Feb. 15, 1950, at which time the stockholders will vote on the pension plan agreements made with the United Steelworkers Union.

The stockholders will vote on two plans. One plan, which has been in effect at Inland for some years, is a contributory plan. The other is similar to the Bethlehem plan.

The board of directors is recommending to stockohlders approval of both plans in order that employees may have a choice of participating in whichever pension plan, in their opinion, best satisfies their requirements.

Armco Celebrating 50th Year

Middletown, Ohio—Armco Steel Corp. will celebrate its 50th anniversary this year with a series of parties this summer to which Armco employees and residents of all communities in which Armco has plants will be invited, according to an announcement by Charles R. Hook, Armco president.

• REMEMBER THE MARCH OF DIMES •

Auto Men Cut Costs

Continued on Page 85

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"I'll never forget the time I told the boss off. Trouble is, neither will he."

Inland Takes an Option On Possible Iron Ore Mine Site

Chicago—The Inland Steel Co. has taken an option to lease a large acreage in the vicinity of Steep Rock Lake, Ontario, for the purpose of exploring and developing a new iron ore mine. The property is owned by Steep Rock Iron Mines, Ltd., of Canada.

The Steep Rock Lake's area is located about 120 miles west of Port Arthur in western Ontario. Exploration and development work in the area began in 1937, and shipments of iron ore began in 1944.

Steep Rock Iron Mines is a producer and seller of iron ore, currently shipping from one mine in the area and actively developing another. However, if exploration proves up a large merchantable iron ore body, Inland will develop and operate a mine on the acreage on which it has taken an option.

J. Wood, Auto Engineer, Retires

Detroit—John G. Wood, who has served as chief engineer of the Chevrolet Div. of General Motors Corp., has retired after 43 years in the automobile industry.

Mr. Wood began his career as a draftsman with the old National company. He was associated with General Motors divisions for 6 years before joining Chevrolet in 1933. Recently, he has served as executive assistant for engineering on the staff of T. H. Keating, general manager of Chevrolet.

Hayes Mfg. Doing Packard Work

Detroit—Hoods and fenders for 1951 model Packards will be produced by Hayes Mfg. Co., of Grand Rapids, Mich., it has been disclosed.

Die-making operations have been authorized but no production schedules have been released, according to R. R. Rees, Packard director of purchases.

Some sources have estimated that $2 million worth of Packard business will be placed with Hayes during the next 2 years.

No Boom, No Bust Seen for Steel Forgings

Order volume this year expected to be within 10 pct of 1949 . . . Dollar volume may be greater . . . Companies will pass on steel price increases—*By BILL LLOYD*

Cleveland—A normal year, neither boom nor bust, is shaping up for producers of commercial steel forgings, spokesmen for major segments of the industry said this week.

It is estimated that the industry this year will come within 10 pct of 1949 order volume. Dollar volume of shipments will equal, if not top, last year's figure. A reason for this is the steel price increase, which the industry will pass along.

Salient point of the 1950 outlook is not so much the development of new markets, but the level of activity of present markets.

Automotive demand, including trucks, looks good for the first half, as do farm implements, petroleum equipment, diesel locomotives and aircraft, if the government programs develop as expected.

Backlogs About 3 Months

Average order backlogs in the industry are about 3 months, based on conservative trade estimates. Hold-ups are not numerous. Plenty of releases on orders held up during the final days of 1949 are coming through.

Other developments, less pleasant, include the demands of labor for wage increases, pensions and fringe benefits, and competition, postwar development of which began last summer, and which is expected to grow increasingly keen. A highly competitive battle for existing markets is on. Costs are going to be increasingly important, particularly during the downward swing of volume, when shop personnel give vent to what one forging company official calls the "human instinct to stretch out the work."

Price Testing to Continue

Price testing will continue throughout the year, although the situation at the moment is quiet. Buyers know that the forge shops are not all operating at normal capacity. On the other hand, no cut throat pricing is expected. The industry learned a lot during the war and is more stable than it was 10 years ago.

If the wage demands are met, higher prices are generally considered to be a certainty.

Supplies Are Adequate

A secondary problem as far as customer relationships are concerned, according to one company official, is the lower inventories which many users of forgings are presently carrying. Part of this is the result of the steel strike induced shortages. "What the customer wants us to do," he said, "is turn around on a dime. Changing dies means higher production costs. Customer runs are not as long as they were last year. If the forging operator doesn't want to do it, he's an unreliable source of supply. What many forging buyers demand amounts to an abnormal flexibility of forging production."

Supply of forging quality billets and bars, carbon or alloy, is not expected to be a problem after Mar. 1. Some temporary tightness exists, but unless the government should dump a big aircraft program, for example, suddenly into manufacturers' laps, as was the case in 1949, no difficulties are expected.

Reaction of many producers of forgings to the steel price increase was not altogether happy. This, according to company spokesmen, is not because of the increase itself, which was to be expected. What forgers, like many other consumers, would have liked was to have the increase for orders placed after a certain date, or 6 weeks or two months notice, permitting them to pass it along on work in process or on quotation. With the higher

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"Bilkins! Consider that order I just gave you cancelled."

Inland Stockholders Will Vote on Two Pension Plans

Chicago—Inland Steel Co. has mailed to stockholders notice of a special meeting Feb. 15, 1950, at which time the stockholders will vote on the pension plan agreements made with the United Steelworkers Union.

The stockholders will vote on two plans. One plan, which has been in effect at Inland for some years, is a contributory plan. The other is similar to the Bethlehem plan.

The board of directors is recommending to stockohlders approval of both plans in order that employees may have a choice of participating in whichever pension plan, in their opinion, best satisfies their requirements.

Armco Celebrating 50th Year

Middletown, Ohio—Armco Steel Corp. will celebrate its 50th anniversary this year with a series of parties this summer to which Armco employees and residents of all communities in which Armco has plants will be invited, according to an announcement by Charles R. Hook, Armco president.

• REMEMBER THE MARCH OF DIMES •

INDUSTRIAL SHORTS

NO MORE COACHES—It has been announced by FORD MOTOR CO. that it will discontinue production of its motor coaches on Apr. 30. The company will continue to produce chassis for school buses. Metropolitan Motor Coaches, Inc., national distributer of Ford motor coaches, will be liquidated.

DISTRIBUTERS TO MEET—It has been announced that the Western Zone meeting of the NATIONAL WELDING SUPPLY ASSN. will take place on Feb. 10 at the St. Francis Hotel in San Francisco.

INCREASES CAPACITY—Additional melting equipment has been erected at the Brooklyn plant of the AMERICAN NICKEL ALLOY MFG. CORP. This will increase their capacity by 3 to 4 million lb of nickel yearly. Their European activities have been expanded since the war and are now concentrated on its Holland subsidiary.

CANADIAN SUBSIDIARY—A modern plant in Chatham, Ontario, is being established by the newly formed TUBE TURNS OF CANADA, LTD., a subsidiary of Tube Turns, Inc., Louisville. The company will manufacture Tube-Turn welding fittings. Operations will start in about 3 months.

EASTERN BRANCH—A new sales office at Syracuse has been opened by CUTLER-HAMMER, INC., Milwaukee. Operating as a branch of the Buffalo office, the new office will cover the eastern half of the Buffalo district.

AIRCO DEALER—Air Reduction Sales Co., New York, has appointed the newly formed RICHMOND WELDING SUPPLY CO., Richmond, as an authorized dealer. The new company is owned and operated by John G. Jones and Arnold Ruedy. They will carry a complete line of Airco gas and electric arc welding equipment supplies and accessories.

WESTERN MARKET—An office at 3040 E. Olympic Blvd., Los Angeles, has been opened by the BROWN & SHARPE MFG. CO., Providence. Machine tools will be carried in stock. Small tools and cutters will be sold through industrial distributors as before. Thomas F. MacLaren will be manager and Ralph P. Sharp and Frank K. Wikley will assist him in serving customers in the San Francisco and northern California areas.

NEW COMPANY—Headed by R. Hugh Daniel as president and treasurer, the DANIEL CONSTRUCTION CO., INC., OF ALABAMA has been organized at Birmingham. The new company will operate separately from the Daniel Construction Co. of Greenville, S. C.

TAKES OVER—The Industrial Dept. of the American Arch Co., Inc., New York, has been purchased by the M. H. DETRICK CO., Chicago. It will be operated as the M. H. Detrick Co., American Arch Div. with offices in the Oliver Bldg., Pittsburgh.

MOVES OFFICE—The Norge division of BORG-WARNER CORP. will move its general offices from Detroit to the Merchandise Mart in Chicago within the next few months. No Norge products have been produced in Detroit since before the war.

HEADS NEFA—Thomas I. Curtin, Waltham Foundry Co., Walthan, Mass., has been elected president of the NEW ENGLAND FOUNDRYMEN'S ASSN. and Robert C. Walker, Whiting Machine Co., Whitinsville, Mass., has been named vice-president.

TOOL AGENT—The Kelly Reamer Co., Cleveland, manufacturers of production tools, has appointed SUPERIOR DETROIT CO., Detroit, as exclusive sales and engineering representatives for the State of Michigan.

New Firm Opens Freight Service From All Gulf Ports

New York—A new world-wide ocean freight service from all principal Gulf ports started operations last week with announcement here of the organization of Gulf Shipping Lines, berth agents and chartering brokers.

Gulf Shipping Lines will represent independent steamship lines on a nonconference basis. It will schedule regular sailings from Houston, Galveston, Brownsville, Corpus Christi, Beaumont, Port Arthur, Lake Charles, New Orleans and Mobile to ports in the West Indies, the Persian Gulf and the Orient.

The firm eventually plans to have upwards of 70 ships in service from Gulf Coast ports, according to A. D. Lee, president.

Drop Forging Outlook

Continued from Page 87

price effective immediately or within a matter of hours, it could not be passed along on orders on the books which lacked escalator clauses. Furthermore, according to one forging sales manager, the present degree of competition makes it difficult to pass along at any time. It will be passed along on new orders and repeat business, however.

Productivity Has Increased

In 1949, some forge shops reported an increase in productivity, which helped. But that might not be the case this year. Also, the shops that place a large number of small tonnage orders feel that the extras on small quantities, which in some cases rose from 32¢ to $1.00, are particularly unpleasant. The big orders are not bothered.

By and large, the commercial steel forging industry has probably reached a postwar normal. Shipments in 1949 were about 15 pct under 1948, when shipments for sale totaled 1,415,137 net tons. Backlogs have been dropping slowly from 5 months in 1948 to the present 3.

Resume Your Reading on Page 87

Detroit Steel Completes Purchase of Portsmouth Steel

Detroit — Detroit Steel Corp. has completed its purchase of physical property, plants and equipment of Portsmouth Steel Corp. The Detroit company gave $6,200,000 in cash and 285,000 shares of Detroit Steel common stock for the Portsmouth property. In return, Portsmouth has turned over the property as well as capital stock of its wholly-owned coal company subsidiaries.

The Portsmouth, Ohio, company will continue to operate as a separate entity. Owners of 2675 shares of stock have filed suit in Federal Court in Cincinnati in an effort to block a new business venture of the Portsmouth Steel Corp.

Reynolds Closes Jackson Plant

Detroit — The Jackson, Mich., plant of Reynolds Spring Co. has been permanently closed, according to Charles G. Munn, president. Executive and engineering offices will continue in Jackson, Mr. Munn said.

The move was made as part of a decentralization plan, it was announced. The company will continue to operate 12 plants in the East and Middlewest making cushion springs for automobiles, one plant producing mechanical springs and a pressed steel plant.

As recently as September 1946, the Jackson plant employed 1800 persons. Recent employment has been listed at about 350.

GM Sets Production Record

Detroit—Official production figures show that General Motors assembled 2,771,194 passenger cars and trucks in the United States and Canada during 1949. This compares with 2,360,659 units produced in 1941, GM's previous high. The 1948 total was 2,147,397 cars and trucks.

Nineteen hundred forty-nine output of passenger cars exceeded the truck total by more than 4 to 1.

Unit output of the several GM divisions is as follows: Chevrolet 1,493,501 cars and trucks; Buick 398,482 cars; Pontiac 336,445 cars and trucks; Cadillac 81,545 cars. The GM Coach and Truck total was 86,016.

Plane Procurement to Continue

Washington—There will be no immediate letup in the government's aircraft procurement program under current budget recommendations sent to Congress last week.

It is recommended that $2.1 billion be made available for new contracts during fiscal 1951. When added to the more than $3 billion in unexpended authorizations, this would provide a total of $5.3 billion worth of aircraft to be delivered in 1951, 1952 and subsequently.

Delivery schedules under present and proposed contracts would provide 2800 planes in 1950, 2300 in 1951, and 3100 in 1952 or shortly thereafter.

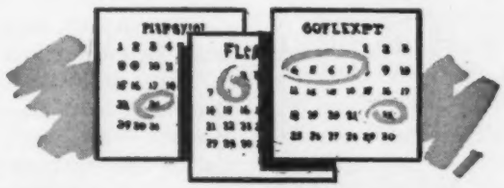
Stockpiling May Be 78 Pct Complete by the End of 1951

Washington — Stockpiling of critical and strategic materials for national defense will be 78 pct complete by the end of 1951 fiscal year if Congress grants the $500 million in new contractual authority which has been requested in the current budget.

This new authority would bring the funds available for stockpiling to within $729 million of the present goal of $3.3 billion worth of strategic materials in storage against emergency.

The recommended $500 million, when added to unexpended balances, would provide a total of $1.1 billion in obligational authority to buy materials for delivery in 1951 and later. It is planned to spend $650 million for the program in 1951 as against $580 million during fiscal year 1950. Of this amount, $500 million will be devoted to new purchases and the remainder to administration.

It is estimated that actual de-



Dates to Remember

• *REMEMBER THE MARCH OF DIMES* •

Jan.	20	**Malleable Founders' Society**, semiannual meeting, Cleveland.
Jan.	22-24	**Institute of Scrap Iron & Steel, Inc.**, annual convention, Washington.
Jan.	23-24	**Industrial Furnace Manufacturers Assn.**, mid-winter meeting, Dearborn.
Jan.	23-27	**American Society of Heating & Ventilating Engineers**, annual meeting, Dallas.
Feb.	12-16	**American Institute of Mining & Metallurgical Engineers**, annual meeting, New York.
Feb.	27-Mar. 3	**American Society for Testing Materials**, spring meeting, Pittsburgh.
Mar.	14-16	**Society of Automotive Engineers**, passenger car, body and production meeting, Detroit.
Mar.	20-25	**Concrete Reinforcing Steel Institute**, annual meeting, Houston.
Mar.	21-22	**Steel Founders' Society of America**, annual meeting, Chicago.
Apr.	3-4	**Assn. of Iron & Steel Engineers**, spring conference, Birmingham.
Apr.	4-8	**Chicago Technical Societies Council**, national production exposition, Chicago.
Apr.	5-7	**American Institute of Electrical Engineers**, conference on electric welding, Detroit.
Apr.	5-7	**Midwest Power Conference**, Chicago.
Apr.	10-14	**American Society of Tool Engineers**, industrial cost-cutting exposition, Philadelphia.
Apr.	25-26	**Metal Powder Assn.**, annual metal powder show, Detroit.
Apr.	27-28	**American Steel Warehouse Assn.**, annual meeting, Houston.

liveries will be about 62 pct complete by July 1950 and 65 pct by July 1951. Another 13 pct will have been contracted for as of the same date.

Also, the coming year will see completion of refining, beneficiation and storage of all materials acquired as war surplus. Presumably, all acquisitions after the current year will consist of new production here and abroad.

RFC Loans in November Went to Variety of Companies

Washington — Loans approved by the Reconstruction Finance Corp. during November included $1 million to Federal Motor Truck Co. of Detroit which will be spent largely for tooling purposes.

Largest loan during the month was $6 million to Pictsweet Foods, Inc., of Mt. Vernon, Wash., primarily for working capital including purchase of materials and supplies. Other November loans included:

H & B American Machinery Co. of South Attleboro, Mass., makers of textile machinery, $1 million; Diamond Full Fashion Hosiery, High Point, N. C., $550,000, for nylon hose-making machinery and other purposes.

Also, a loan of $2.5 million was approved for the Texas Housing Corp. of Dallas, maker of factory-built conventional houses, and $1.1 million to the Strathmoor Lumber & Supply Co. of Detroit, also builders of factory-produced housing.

Prestressed Concrete Bids for Construction

First linear girder job using prestressed concrete is underway . . . More than 600 prestressed tanks already built . . . Uses high tensile wire—BY JOHN ANTHONY

Philadelphia—A relatively new type of construction for structures such as bridge girders, slabs, large diameter pipe and large tanks shows some promise of becoming an important factor in steel marketing. The development involves the use of a prestressing technique for concrete, now applied for the first time in this country to long span bridge girders. It may forecast competition for reinforcing steel, plates, shapes and fabricated plate girders if the technique takes hold as expected by some contractors.

First Girder Job Underway

In Europe prestressed concrete for beam and girder construction is much farther advanced. But the U. S. has pushed ahead with prestressed cylindrical structures. More than 600 large prestressed tanks have been built in this country using high tensile wire. They have been used for water, oil and gasoline storage, for sewage sludge digesters, as silos for the storage of raw materials, and as tanks for chemicals.

The first prestressed concrete linear girder job in this country is now under construction here in Fairmount Park, the Walnut Lane bridge over Paper Mill Creek Valley. This is a deck girder bridge in which a design employing prestressed concrete girders has been adopted because of considerably lower cost that the original plan for a reinforced concrete arch construction.

The principle underlying prestressed concrete involves use of the high strength of concrete in compression. Force is applied to the concrete structure in such a way as to overcome tensile stresses due to dead and live loads. This technique prevents cracking of the concrete under load. Prestressing, in effect, converts concrete into an elastic homogenous material, permitting the girder in compression to make use of its full load carrying potential. A girder which sustains bending should be able to span greater distances than has heretofore been possible.

Center Span Is 160 Ft

Officials of Preload Enterprises, Inc., New York, holders of basic patents applicable to this field of construction, estimate that prestressed girders will be fully competitive with built-up steel plate girders, fireproofed, in lengths of 60 ft or more. They are expected to be competitive, without fireproofing, in lengths of 80 ft and longer. They are not expected to

November Blast Furnace Production

As Reported to American Iron & Steel Institute

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total		Percent of capacity	
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Current month	Year to date
Distribution by Districts:										
Eastern	12	13,353,580	706,616	9,552,276	18,348	265,555	724,964	9,817,831	66.0	80.3
Pittsburgh-Youngstown	17	26,625,920	906,111	17,946,156	3,804	181,873	909,915	18,128,029	41.5	74.4
Cleveland-Detroit	6	6,984,600	262,483	4,881,795	-	-	262,483	4,881,795	45.7	76.4
Chicago	7	15,655,390	475,952	10,320,532	-	25,838	475,952	10,346,370	36.9	72.2
Southern	9	5,010,060	199,855	3,765,568	6,814	72,167	206,669	3,837,735	50.1	83.7
Western	4	2,912,300	141,788	1,963,868	-	-	141,788	1,963,868	59.2	73.7
Total	37	70,541,850	2,692,805	48,430,195	28,966	545,433	2,721,771	48,975,628	46.9	75.9

be competitive with rolled steel sections.

The Walnut Lane bridge incorporates a center span of 160 ft length, flanked by 74 ft approach spans. The center span has 13 precast flanged concrete girders 6 ft 7 in. deep. Approach spans have seven similar but shorter girders.

Longitudinal prestressing is done by applying tension to groups of single strand high carbon steel wires located in the bottom flange of the girder. Each main span girder has four wire units carrying 64 wires each placed in position in longitudinal openings. Each approach span girder has one wire unit of 48 wires and two 24 wire units. By positioning hollow rubber forms before pouring the concrete, the openings are made for the wire units. The rubber forms are collapsed and withdrawn after the concrete hardens.

How It Is Done

In main span girders, two wire units are set horizontally in the forms. The other two curve upward from a low center position along a rising parabola. In side spans, only the 48 wire unit is curved upward.

After hardening of the concrete, wires are prestressed in pairs by specially designed hydraulic jacks. Then they are locked into grooves in a flat steel plate by means of wedges. Grout is forced into the wire openings until they are filled. When all the girders are in place, they are pulled together laterally by transverse prestressed wire units running through steel diaphrams.

Need High Tensile Wire

The prestressing wire is hard drawn special bright MB spring wire, 0.276 in. diam, furnished by John A. Roebling's Sons Co., Trenton, N. J. Special heat treatment is given to the wire, which permits it to develop an ultimate strength of 242,000 psi and a yield of 213,000 psi. Use of the high tensile wire is essential to provide sufficient margin for steel stress losses due to shrinkage and plastic flow.

Although further growth in the use of prestressed concrete construction would add new competition for some steel products, tonnages of high tensile wire may then be consumed by this development. If construction costs can be cut down as expected, expanded building operations may actually add to reinforcing steel demand.

In prestressed domed tank construction, for example, a one million gal capacity tank requires about 5 tons of high tensile wire and 7½ tons of reinforcing steel. A 10 million gal domed tank requires more than 80 tons of high tensile wire and 50 tons of reinforcing steel.

Barium Pours First Steel at Phoenixville

Blooming mill and structural mill also ready to start operating . . . acquisition of Chester blast furnace completes integration of the company.

Phoenixville, Pa. — Now that Barium Steel Corp. has completed its integration by buying the Chester, Pa., blast furnace and the Phoenix Iron & Steel Co., the work of getting all facilities in tip top operating condition is being pushed at a feverish pace.

Final details are being completed this week which will permit the company to start pouring steel from two openhearths at Phoenixville Jan. 20. Two more openhearths are being made ready and should start pouring steel in the near future.

The blooming mill at Phoenix-

Turn to Page 92

1949 Steel Production

As Reported to American Iron & Steel Institute

Period	OPEN HEARTH Net tons	OPEN HEARTH Percent of capacity	BESSEMER Net tons	BESSEMER Percent of capacity	ELECTRIC Net tons	ELECTRIC Percent of capacity	TOTAL Net tons	TOTAL Percent of capacity	Calculated weekly production (Net tons)	Number of weeks in month
January	7,287,683	101.1	408,552	92.6	487,260	93.8	8,183,495	100.2	1,847,290	4.43
February	6,633,779	102.0	379,698	95.3	467,247	99.6	7,480,724	101.4	1,870,181	4.00
March	7,473,901	103.7	430,176	97.5	483,850	93.2	8,387,927	102.7	1,893,437	4.43
1st Quarter	21,395,363	102.3	1,218,426	95.2	1,438,357	95.4	24,052,146	101.5	1,870,307	12.86
April	7,015,611	100.5	404,095	94.6	365,570	72.7	7,785,276	98.4	1,814,750	4.29
May	6,889,230	95.6	400,741	90.9	299,751	57.7	7,589,722	92.9	1,713,256	4.43
June	5,954,619	85.3	349,196	81.8	194,386	38.6	6,498,201	82.2	1,514,732	4.29
2nd Quarter	19,859,460	93.8	1,154,032	89.1	859,707	56.4	21,873,199	91.2	1,681,260	13.01
1st 6 months	41,254,823	98.0	2,372,458	92.1	2,298,064	75.8	45,925,345	96.3	1,775,236	25.87
July	5,307,471	73.8	300,236	68.2	171,415	33.1	5,779,122	70.9	1,307,494	4.42
August	6,101,499	84.7	355,335	80.6	257,910	49.7	6,714,744	82.2	1,515,744	4.43
September	5,992,306	86.1	350,282	82.2	247,601	49.3	6,590,189	83.5	1,539,764	4.28
3rd Quarter	17,401,276	81.5	1,005,853	76.9	676,926	44.0	19,084,055	78.8	1,453,470	13.13
9 months	58,656,099	92.5	3,378,311	87.0	2,974,990	65.1	65,009,400	90.4	1,666,908	39.00
* October	814,374	11.3	———	—	111,059	21.4	925,433	11.3	208,901	4.43
* November	3,805,730	54.5	172,270	40.3	238,262	47.4	4,216,262	53.3	982,812	4.29
† December	6,952,669	96.7	396,075	90.0	361,104	69.7	7,709,848	94.6	1,744,310	4.42
† 4th Quarter	11,572,773	54.1	568,345	43.4	710,425	46.1	12,851,543	53.1	978,047	13.14
† 2nd 6 months	28,974,049	67.8	1,574,198	60.2	1,387,351	45.0	31,935,598	65.9	1,215,668	26.27
† Total	70,228,872	82.8	3,946,656	76.0	3,685,415	60.3	77,860,943	81.0	1,493,305	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons Bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of January 1, 1949 as follows: Open hearth 84,817,040 net tons, Bessemer 5,191,000 net tons, Electric 6,112,890 net tons, total 96,120,930 net tons.

† Preliminary figures, subject to revision.

* Revised.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"Deficit Financing And Full Employment"

THE notion that full employment is the test of effective public policy has been generally accepted, not only by the present Administration but also by a substantial fringe of "enlightened" conservatives. It is the great argument for deficit financing. To promote employment calls for a "constructive" use of public credit. It is the "humanitarian" approach to finance.

This kind of thinking about jobs completely ignores the factor of price. The applicant for a job is offering something for sale. The buyer, i.e., the employer, must be certain that he is getting reasonable value for the cost, for he in turn must sell the results of employment.

High wages have the same effect on the demand for labor as high prices in any other market. Every auto sales manager knows that a rise of $100 in the price of a car, other things being equal, will have an immediate effect on the demand for cars. To expect this sales manager to dispose of total production without regard to price is unrealistic. Yet this is exactly what the advocates of full employment expect. They maintain that irrespective of wage levels the economy must provide jobs for all, or confess failure.

It must be clear to anyone with elementary horse sense that the worker himself has some responsibility for the jobs that may be available. If he demands too much for his services, if he is unreliable, if he resists discipline, then the number of employers will shrink and unemployment will mount. Deficit financing cannot be a cure for a shrinking labor market.

The grist of news during the past week provides two striking illustrations of the principle that labor costs have a definite, direct relation to jobs.

At the year-end George H. Love, President of Pittsburgh Consolidation Coal Co., announced the abandonment of an ambitious project for the commercial manufacture of gas and gasoline from coal. Obviously, such a utilization of coal would greatly expand the job opportunities for coal miners. Such a rise in the demand for labor might well be one of the major objectives of labor union leadership. Yet it is precisely because of the effect of this leadership on a steady, reliable flow of coal at reasonable prices that the project of Pittsburgh Consolidation Coal had to be abandoned.

During the first week of the new year the metropolitan area was stunned by the sudden sale of The Sun. This fine old newspaper succumbed to rising costs. It gave up its distinguished ghost because mounting wages had imposed a burden which the paper could no longer sustain. Hundreds of employees lost their jobs.

It is only fair to say that in these two instances high labor costs were not the only factors involved. Yet it can hardly be denied that great labor power, unwisely used by ambitious and arrogant leaders, snuffed out thousands of promising jobs.

What happened so dramatically in these two instances is occurring every day throughout the country. Active employers are culling their job rolls because labor comes too high. Potential employers abandon projects providing new jobs because labor monopolies and excessive labor costs make such ventures unattractive.

Full employment cannot be placed at the doorstep of the U. S. Treasury. It cannot be guaranteed by a flood of red ink. When we assess responsibility for unemployment, labor leadership must accept a large share of the blame.

Phoenixville Plant Running

Continued from Page 91

ville has been completely overhauled. It will also start operating Jan. 20. The 24-in structural mill is scheduled to start turning out finished steel Jan. 23. Smaller structural shapes have been made for the past few months with purchased semi-finished steel.

Acquisition of the Chester blast furnace will enable Barium to make its own basic pig iron for use in its Phoenixville and Harrisburg, Pa., steel plants, the company reported. Previously it had been dependent on purchased merchant iron and scrap.

Furnace In Good Shape

Barium reports that the Chester furnace is in excellent condition. Its location on the Delaware River is regarded as favorable for using not only domestic ores, but those now readily available from South America, Cuba, Liberia, North Africa and Spain. Labrador, too, will be a consideration when that potentially important source is brought into production.

With its latest acquisitions, Barium Steel Corp.'s annual capacity shapes up about like this:

Basic Pig Iron	160,000 net tons
Steel Ingots (Open-hearth & Electric)	800,000 net tons
Semifinished & Finished Steel	600,000 net tons

Simplifies Contract Procedure

Washington — Two government departments moved recently to make it easier to get business contracts.

The Defense Dept. will shortly designate about nine key cities to which Army, Navy and Air Force purchasing offices will send daily information on notices or invitation to bid, including materials, quantity, and closing date of bid. These would be made immediately available to interested parties.

Along the same line, the Atomic Energy Commission has issued a "Guide for Contracting of Construction and Related Engineering Services."

The AEC booklet describes types

of construction and engineering contracts and steps to be taken for obtaining contracts which cannot be sought through formal advertising. It is supplementary to last year's booklet describing how to do general business with the commission.

Pocket Size Manuals Cover Grinding Standards, Trucking

Milwaukee—Three pocket size manuals prepared by standards committees at Allis-Chalmers Mfg. Co. have just been announced. Two of the booklets cover grinding standards and practices. The third is a trucking manual.

The 32-page grinding standards booklet for supervisory personnel lists the responsibilities of the purchasing department, safety organization, foremen, tool crib, maintenance department and employees in connection with the use of all types of grinders. The 20-page illustrated grinding practices manual for workers designates rules and safe practices for the use of all grinding equipment. The 20-page illustrated trucking manual describes safe practices for shop trucking operations, and includes safety rules for manual materials handling as well.

Copies of the manuals are available upon request to the Health and Safety Dept., Allis-Chalmers Mfg. Co., Milwaukee 1.

Tool Engineers Plan Meeting

Philadelphia—The industrial future of the United States will be the subject of the opening meeting of the Industrial Cost-Cutting Exposition sponsored by the American Society of Tool Engineers in Philadelphia on Apr. 10.

Arrangements for this meeting are being made by a committee of publishers with J. C. Hildreth, president, Chilton Co., Philadelphia, as chairman, and including Robert B. Luchars, president, Industrial Publishing Co., New York, and Earl L. Shaner, chairman of the board, Penton Publishing Co., Cleveland.

• REMEMBER THE MARCH OF DIMES •

Plastics Industry Eyes New Markets

Output of plastics has increased 7 times in 10 years . . . Marketing experts forsee doubling in next decade . . . Not considered competitive with steel.

Cleveland—Plastics, a synthetic material born in the carpetbag era following the Civil War, is infiltrating new and bigger markets, some of them the traditional province of the steel and nonferrous metals industry, including piping, store fronts, machine housings, tote boxes, window screens and filters.

Focal point of the plastics industry last week was Cleveland where by coincidence the sixth annual technical conference of the Society of Plastics Engineers, Inc., and the fifth annual technical session and exhibit of the Reinforced Plastics Div. of the Society of the Plastics Industry, Inc., were held simultaneously.

Industry Is Growing Fast

Indicative of the terrific growth of the plastics industry, production of synthetic resin, raw material of the industry, jumped from 213,017,548 lb in 1939 to 1,500,000,000 lb in 1949.

This, however, is only the beginning, according to some of the plastics industry's marketing experts, who foresee a doubling of present production within the next 10 years.

Plastics is a billion dollar industry, according to its proponents. The number of injection and compression molders and extruders of plastics materials currently operating in the U. S. is estimated at 1300 companies, fabricators of sheet rod and tube approximate 150 firms, fabricators of film and sheeting run into the hundreds and manufacturers of raw materials total about 30 companies. Employment in the entire plastics industry is estimated at 100,000.

Plastics Supplement Steel

While the 1,500,000,000 lb or 750,000 tons of synthetic resins produced in 1949 hardly constitutes a threat to the steel industry's 1949 output of 77,500,000 tons, the plastics people mean business. Big companies are pouring money into plastics research and development, new plants and fabricating facilities, which is some sort of evidence that plastics has a big, if not fabulous, future.

Plastics people generally do not consider the material competitive with steel, or for that matter, with any other established material. They feel plastics are a supplementary material, which is creating markets for steel and wood, in the course of its own development.

More Expansion Indicated

Fields in which plastics products indicate further expansion in 1950 include television and radio, for much larger molded parts, house furnishings, housewares, tableware and packaging. According to a recent survey, automotive and refrigerator manufacturers will be using more plastics.

Biggest molded plastics product, a one-piece television cabinet weighing 35 lb, was made in 1949, and present developments in the molded plastics field indicate that

Turn to Page 94

New Insurance Plan at Dravo

Pittsburgh — Dravo Corp. has put into effect a new liberalized social insurance program, cost of which is shared equally between the company and employes. Ninety-seven pct of the employes have enrolled.

The plan, supplanting a program in effect since 1919, provides non-occupational accident and sickness benefits, hospitalization insurance, surgical benefits and up to $5,000 life insurance, for hourly-rated employes.

Construction Steel Awards

Fabricated steel awards this week included the following:

2780 Tons, Philadelphia, hospital for Veterans' Administration, to Bethlehem Steel Co., Bethlehem.

1200 Tons, Patton, Pa., bridge, Pennsylvania Turnpike Authority, Section 31(d), to Ralph Myers Construction Co., Pittsburgh.

670 Tons, Detroit, industrial building, to Jos. T. Ryerson & Son, Inc., Chicago.

660 Tons, Oakland, Calif., superstructure, Fruitvale Ave. RR bridge, to Judson Pacific Murphy Corp., San Francisco.

490 Tons, Mankato, Minn., Wilmarth Station No. 2, Northern States Power Co., to Mississippi Valley Structural Steel Co., Chicago.

350 Tons, Westmoreland County, Pa., bridge, Pennsylvania Turnpike Authority, Section 31(e), to Pavia Construction Co., Pittsburgh.

215 Tons, Boston, Park Drive in the Back Bay, reconstruction of bridge and approaches through A. Singarella and Sons, Dorchester to Groisser and Shlager Iron Works, Somerville, Mass.

160 Tons, Harrisburg, Pa., store for G. C. Murphy Co., to Standard Equipment Co., Harrisburg, Pa.

140 Tons, New York, Children's Aid Society Bldg., to Grand Iron Works, New York.

130 Tons, Bethesda, Md., miscellaneous angles for chemical center, to Bethlehem Steel Co., Bethlehem.

Fabricated steel inquiries this week included the following:

545 Tons, Reading and Woburn, Mass., seven bridges and bituminous concrete surfacing, Route 128.

435 Tons, Lancaster, N. H., and Guidhall, Vt., 404 foot twin span truss bridge on Gorham Hill Rd., U. S. Route 2, over Connecticut River. Bids due Jan. 12.

250 Tons, Deerfield, Mass., four-span steel stringer bridge with reinforced concrete.

130 Tons, Ephrata, Wash., Lind Coulee bridge, etc., Bureau of Reclamation, Ephrata, Spec. 2876, bids to Jan. 31.

100 Tons, Berks County, Pa., construction of an I-beam bridge, Secretary of Highways, Harrisburg, Pa. Bids to Jan. 27.

Reinforcing bar awards this week included the following:

800 Tons, Ann Arbor, Mich., Ann Arbor University Dormatories to Truscon Steel Co., Cleveland.

460 Tons, Hammond, Ind., Indiana highway bridge to O. J. Deane Co., Chicago.

355 Tons, Munster, Ind., Indiana highway bridge, to O. J. Deane Co., Chicago.

180 Tons, Middletown, Ohio, Armco Steel plant to Sheffield Steel Co., Kansas City.

100 Tons, Wilkes Barre, Pa., Jewish Community Center, through Sordoni Construction Co., Wilkes Barre, Pa., to Bethlehem Steel Co., Bethlehem.

Reinforcing bar inquiries this week included the following:

800 Tons, Reading and Woburn, Mass., seven bridges and bituminous concrete surfacing on Route 128, (Circumferential Highway). Completion date June 30, 1951.

765 Tons, Minneapolis, livestock coliseum.

755 Tons, Ephrata, Wash., structures of East Low Canal and Weber wasteway, Bureau of Reclamation, Ephrata, Spec. 2879, bids to Feb. 2.

660 Tons, Chicago, sewer contract No. 8.

600 Tons, Allegheny County, Pa., Pennsylvania Turnpike sections 31D & 31E.

600 Tons, Los Angeles, Dominguez Channel, Inglewood Ave., County Clerk, Los Angeles, bids to Feb. 7.

525 Tons, Los Angeles, bridge over Hollywood Freeway at Hill St., California Div. of Highways, Los Angeles, bids to Jan. 26.

345 Tons, Evanston, Ill., Mather home.

175 Tons, Salem, Gloucester Counties, N. J., New Jersey Turnpike Authority, Sections 33(a) and 33(b), due Feb. 7.

135 Tons, Sandwich, Mass., three concrete rigid frame bridges with bituminous concrete ramp.

100 Tons, Sussex County, N. J., New Jersey Dept. of Highways, Route 23(a), due Feb. 2.

Steel piling inquiries this week included the following:

270 Tons, Middlesex County, N. J., bridge over Raritan River, Contract No. 4, includes 75 tons of reinforcing steel, due Feb. 7.

Steel rail inquiries this week included the following:

7210 Tons, Walla Walla, Wash., 115 lb. RE sect. RR rail for Spokane, Portland & Seattle Railway relocation, Walla Walla District, Corps of Engineers, Serial CIV-ENG-45-164-50-74, bids to Jan. 20.

ECA Approves Swedish Loan

Washington — A loan up to $350,000, based on the principle that it will be repaid in lead or zinc or both, has been approved for Sweden by the Economic Cooperation Administration.

The loan will be used by the AB Zinkgruver Co. which will try to raise another $2 million in Scandinavian money, for buying pumping, hoisting and other mining equipment from this country.

Equipment to be purchased will be used to help expand Zinkgruver operations in four lead, zinc and copper mines near Falun.

Blast Furnace Started

Pittsburgh — Ending 6 months of idleness the No. 1 blast furnace at the Duquesne Works of Carnegie-Illinois Steel Corp. was returned to production last Monday.

To Vote on Pension Plan

Youngstown — Shareholders of Youngstown Sheet & Tube Co. are receiving notices of a special meeting to be held here Feb. 15 to ratify or reject a proposed pension plan demanded by United Steelworkers of America.

Heads New England Foundrymen

Boston—Thomas L. Curtin, president and general manager of Waltham Foundry Co., was elected president of the New England Foundrymen's Assn. at the 54th annual meeting held at the Parker House Jan. 11.

Plastics Seek New Markets

Continued from Page 93

bigger products, including a one-piece television cabinet weighing 75 lb will be made this year.

Other applications opening up include piping for the oil fields, flooring for the building construction field, builders' blocks for interior partitions, wall tile, ice cube trays, etc.

Stress Correct Applications

But the industry also has some problems, foremost of which is probably correct applications of plastics. This has public relations overtones, to which the industry is highly sensitive. An educational job on fabricators and industry standards are in the making.

Another problem is cost. Estimates of the average costs of plastics per pound range around 45¢ compared with 3.837¢ for steel (IRON AGE finished steel composite). Fire hazard is another. Many plastics are fire retardent but not flameproof and the industry is now shooting for higher heat resistant plactics in the range of 400° to 500°F.

Through lamination and other developments, strength is no longer a problem. At a tensile strength of 65,000 psi some reinforced plastics are in the range of structural. This range can be extended to 135,000 psi which brings into consideration projects like plastic automobile bodies, etc.

Machining Is a Problem

Another problem is machining—the abrasive qualities of most plastics require diamond wheels and carbide tipped cutters.

Some people in the plastics industry liken the industry to the cement industry before the era of reinforced concrete. The reinforcement made concrete a complete building material, they point out, and laminations will do the same for plastics.

But the big factor in plastic's favor is the fact that most plastics can be formed or fabricated into a finished product.

Resume Your Reading on Page 93

Briefs and Bulletins

titanium company —Allegheny Ludlum Steel Corp. and National Lead Co. have formed a new company for marketing and distributing titanium metal and related products. The jointly-owned company, Titanium Metals Corp. of America, will make its headquarters in New York City. National Lead produces titanium in sponge form and Allegheny Ludlum melts and processes it into forgings, bar, sheet, strip and wire. Officers of the company are H. C. Wildner, National Lead, president; Clark W. King, Allegheny Ludlum, vice-president, and A. H. Drewes, National Lead, secretary-treasurer.

quick rejection—To a proposal by Admiral Ben Moreell, president of Jones & Laughlin Steel Corp., that coal miners accept the same pension-social insurance program as that won by steelworkers, came this reply by John Busarello, president of United Mine Workers District 5: "Admiral Moreell is wasting his time." The Admiral's offer was made in a signed statement in J & L's employe publication. The J & L head predicted high-level operations for his company during the next 6 months.

narrowing gap—Recent price revisions have radically changed some existing price relationships between products. One of the big surprises revealed by price analysis is that the gap between alloy and carbon bars has been greatly narrowed. Carbon bars took a 50 pct bigger jump than alloy grades. One prominent Detroit metallurgist thinks the change is important enough to slow, if it doesn't halt the automotive industry trend from alloy to carbon steel bars.

raises pig iron—Republic Steel Corp. has raised its Birmingham pig iron prices $3 a ton. This makes Republic's price on basic iron at Birmingham $41.88, while its No. 2 foundry iron is priced at $42.38. At press time other producers had not changed their prices.

delivery charge—Most warehouses have raised their delivery charge to 20¢ per 100 lb. The major exceptions are at Philadelphia, Cincinnati, Birmingham and New Orleans where they are still charging 15¢ per 100 lb for delivery.

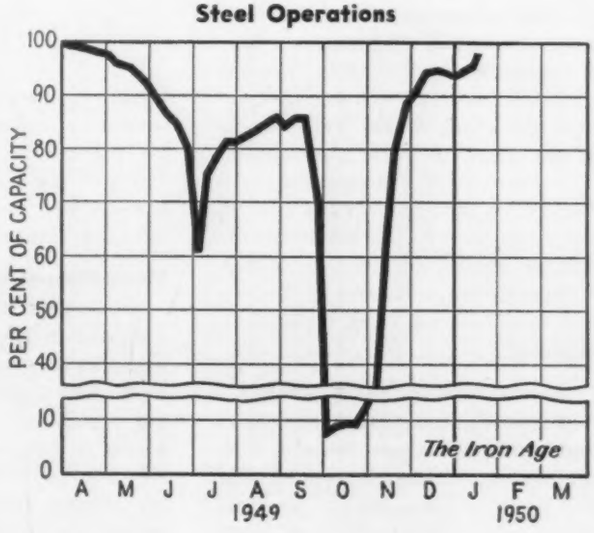
spring steel boosted—Major producers of cold-rolled spring steel have raised their prices by $3 a ton on 0.26 to 0.40 C steel. Prices were increased $9 a ton on higher carbon grades.

tungsten—Ferrotungsten from Great Britain and Japan is being offered to the U. S. market at between $1.55 to $1.60 per lb, duty paid, which is approximately 65¢ below the price of domestic producers. Japan is reported to have available for shipment here 50,000 lb of contained W a month. Britain is also offering tungsten powder at about 30 pct less than the domestic market, permitted by the devaluation of sterling. The powder is reported to be available to the extent of 20,000 to 25,000 lb of tungsten content a month.

one hundred million — Steel capacity now closely approaches 100 million tons a year, as of Jan. 1, 1950, according to the American Iron & Steel Institute. The new record high capacity level is 99,392,800 tons of ingots and steel for castings. An increase of 3,271,870 tons was achieved by steel companies during 1949. Total steel capacity is up nearly 18 million tons since 1940. Steel capacity has risen nearly 22 pct since 1940. The population of the United States has increased about 15½ pct.

hot strip mill —Pittsburgh Engineering & Machine Co., subsidiary of Pittsburgh Steel Foundry Corp., is building a $10 million hot strip mill for the Detroit Steel Corp. at Portsmouth, Ohio.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 8	98.5*	97.5	87.0*	88.0	100.5*	103.5	101.0	102.0	104.0*	97.0	88.0	89.5	95.5	97.0
January 15	99.5	98.0	87.0	89.5	98.5	103.5	101.0	102.0	101.0	92.5	88.0	87.0	91.5	96.0

* Revised.

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

Copper advance not expected even with the strong market ... Spread in zinc continues ... Bulk of buying at low price ... Tin and antimony prices drop ... Lead market quiet.

New York—The December figures of the Copper Institute show industry inventories of 116,027 tons which, when consignment stocks in the hands of consumers are taken into consideration, is pretty close to the minimum. The inventory figure has shown monthly reductions over the last four months, a total reduction of 100,000 tons since the end of August.

Domestic crude copper production from ore and scrap in December was about 80,000 tons, roughly the same as November output. The 48-hr work week recently put into effect by producers is not expected to be reflected in production figures until February or March. Deliveries to customers in December were 107,662 tons, as high as expected.

Copper Advance Not Expected

With this statistical background, and continued active demand, it is quite apparent that the copper market is in a very strong position. There are indications that some of the factors in the market judge the time ripe for an increase.

But there are some considerations that tend to rule out an early increase. One of them is the expected increase in domestic refined production due to the extended work week. Another factor is the feeling in some portions of the producing industry that an unstable market is bad for producers and bad for consumers. And consumers feel that the 18.50¢ price is about right for copper.

More Zinc at 9.75¢

Early this week there was still a spread in the zinc market. Most producers were still at the 10.00¢ level. But there was not much being sold at this price. This week a new factor started selling at the lower level. With the tonnage being offered generally, it is not expected that the spread will continue very long. On the other hand the conditions of the market are strong. It is expected that even at the 10.00¢ level there will be closedowns of production facilities.

RFC reduced the price of tin by ¾¢ per lb on Jan. 13. This brings the price of Grade A to 76.25¢. The RFC price has been cut repeatedly to meet the competition of importers ever since the opening of the free market in tin.

National Lead Co. reduced its price for antimony by 3¼¢ to 28¾¢ Laredo, Tex., on Jan. 13. This action merely recognizes the state of the antimony market. However, the reduction was not sufficient to permit domestic antimony to compete with foreign metal. Yugoslavian antimony has been coming into the country for some time at prices of 25¢ and 26¢ duty paid New York. Not very much Chinese antimony has been coming into the country, but recently some was sold at 24¢ New York.

The lead market has been quiet. Sales reported by some sellers are on the upturn. Others do not find themselves in such a fortunate position.

NONFERROUS METALS PRICES

	Jan. 11	Jan. 12	Jan. 13	Jan. 14	Jan. 16	Jan. 17
Copper, electro, Conn.	18.50	18.50	18.50	18.50	18.50	18.50
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Straits, New York	77.00	77.00	76.25	76.25	76.25	76.25
Zinc, East St. Louis	9.75–10.00	9.75–10.00	9.75–10.00	9.75–10.00	9.75–10.00	9.75–10.00
Lead, St. Louis	11.80	11.80	11.80	11.80	11.80	11.80

Note: Quotations are going prices.

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 24¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 26.5¢ to 32¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4; ⅛ to 11/32 in., 49¢ to 38¢; ⅜ to 1½ in., 37.5¢ to 35.5¢; 1 9/16 to 3 in., 35.5¢ to 32.5¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.; 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 33.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T-6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ⅛ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher. Base: Up to ¾ in. diam., 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	....	31.78
Copper, h-r	....	28.03	....
Copper, drawn	....	29.28	....
Low brass	30.12	29.81	33.03*
Yellow brass	28.69	28.38	31.70*
Red brass	30.60	30.29	33.51*
Naval brass	33.51	27.57	28.82
Leaded brass	....	23.19	27.22
Com'l bronze	31.61	31.30	34.27*
Manganese bronze	37.01	36.92	32.42
Phosphor bronze	50.90	51.15	....
Muntz metal	31.58	27.14	28.39
Everdur, Herculoy, Olympic, etc.	37.19	36.14	....
Nickel silver, 10 pct	39.66	41.87	46.80
Arch. bronze	....	....	27.22

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed 17.00
Aluminum pig 16.00
Antimony, American, Laredo, Tex. 28.75
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be $24.50
Beryllium aluminum 5% Be, dollars per lb contained Be $52.00
Bismuth, ton lots $2.00
Cadmium, del'd $2.00
Cobalt, 97-99% (per lb) ... $1.80 to $1.87
Copper, electro, Conn. Valley 18.50
Copper, lake, Conn. Valley 18.625
Gold, U. S. Treas., dollars per oz. .. $35.00
Indium, 99.8%, dollars per troy oz. . $2.25
Iridium, dollars per troy oz. .. $100 to $110
Lead, St. Louis 11.80
Lead, New York 12.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex. 20.50
Magnesium, sticks, 100 to 5000 lb ..... 36¢ to 38¢
Mercury, dollars per 76-lb flask f.o.b. New York ..... $70 to $73
Nickel, electro, f.o.b. New York 42.97
Palladium, dollars per troy oz. $24.00
Platinum, dollars per troy oz. .. $69 to $72
Silver, New York, cents per oz. 73.25
Tin, New York 76.25
Zinc, East St. Louis ..... 9.75 to 10.00
Zinc, New York 10.72
Zirconium copper, 10-12 pct Zr, per lb contained Zr $12.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 16.75-18.25
No. 120 ..... 16.25-17.75
No. 123 ..... 15.75-17.25
80-10-10 ingot
No. 305 ..... 21.75
No. 315 ..... 19.75
88-10-2 ingot
No. 210 ..... 27.75
No. 215 ..... 25.25
No. 245 ..... 18.25-21.00
Yellow ingot
No. 405 ..... 14.25-16.00
Manganese bronze
No. 421 ..... 20.75

Aluminum Ingot

(Cents per lb, lot of 30,000 lb)

95-5 aluminum-silicon alloys
0.30 copper, max. 18.50-19.00
0.60 copper, max. 18.25-18.75
Piston alloys (No. 122 type) .. 16.50-17.00
No. 12 alum. (No. 2 grade) ... 16.25-16.75
108 alloy 16.75-17.25
195 alloy 17.50-18.00
13 alloy 18.50-19.00
AXS-679 ..... 16.75-17.25
5% Ti, Aluminum, f.o.b., Eddystone, Pa. Low copper 31.00
2% copper 28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½% 17.75-18.50
Grade 2—92-95% 16.75-17.50
Grade 3—90-92% 15.75-16.50
Grade 4—85-90% 15.25-15.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper
Cast, oval, 15 in. or longer 35½
Electrodeposited 29¾
Rolled, oval, straight, delivered .. 33
Ball anodes 33¾
Brass, 80-20
Cast, oval, 15 in. or longer 31½
Zinc, oval, 99.886, f.o.b. Detroit. 17½
Ball anodes 16½
Nickel 99 pct plus
Cast 59.00
Rolled, depolarized 60.00
Cadmium $2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. 79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 46½
Copper sulfate, 99.5 crystals, bbl. .. 11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed 18.00
Nickel chloride, 300 lb bbl 24.50
Silver cyanide, 100 oz lots, per oz. . 59
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc sulfate, 89 pct granular 11.00
Zinc cyanide, 100 lb drums 38.00

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	15½	14¾
Yellow brass	12½	11⅝
Red brass	14	13¼
Commercial bronze	14¼	13½
Manganese bronze	12	11¼
Leaded brass rod ends	12¼	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire 15.50
No. 2 copper wire 14.50
Light copper 13.50
Refinery brass 13.75*
Radiators 9.75
*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire 15.50
No. 2 copper wire 14.50
Light copper 13.50
No. 1 composition 12.75
No. 1 comp. turnings 12.25
Rolled brass 10.75
Brass pipe 11.00
Radiators 10.00
Heavy yellow brass 9.75

Aluminum

Mixed old cast 10.00-10.50
Mixed old clips 10.00-10.50
Mixed turnings, dry 8.50- 9.00
Pots and pans 10.00-10.50
Low copper 11.50-12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	13¾—14
No. 2 heavy copper and wire	12¾—13
Light copper	11¾—12
Auto radiators (unsweated)	8½— 8¾
No. 1 composition	11 —11¼
No. 1 composition turnings	10½—10¾
Clean red car boxes	9 — 9¼
Cocks and faucets	9 — 9¼
Mixed heavy yellow brass	7¼ — 7½
Old rolled brass	8½— 8¾
Brass pipe	9¼— 9½
New soft brass clippings	10½—11
Brass rod ends	9¾—10
No. 1 brass rod turnings	9½— 9¾

Aluminum

Alum. pistons and struts	4½— 5
Aluminum crankcases	7½— 8
2S aluminum clippings	10½—11
Old sheet and utensils	7½— 8
Borings and turnings	4
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	6½— 7
Old zinc	4 — 4½
Zinc routings	2½— 3
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	21 —23
Clean nickel turnings	14 —15
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	9½— 9¾
Battery plates (dry)	4½— 4¾

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	60 —62
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	9 — 9¼
Solder joints	11½—12
Siphon tops	40 —42
Small foundry type	11½—12
Monotype	10½—11
Lino. and stereotype	9¾—10¼
Electrotype	8¼— 8½
New type shell cuttings	11½—11¾
Hand picked type shells	4 — 4½
Lino. and stereo. dross	4¾— 5
Electro. dross	2¾— 3

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Market Undertone Weak With Little Mill Buying

The market undertone is definitely on the weak side and there were only a few items where the quotations are higher than the previous week. Consumers have shown little interest in buying large tonnages. In most instances inventories are substantial and the exceptionally good weather has favored the mills, permitting them to put off their buying for the present. The mills have shown some inclination to buy No. 1 steel, thereby avoiding the troubles that some have recently experienced by using bundles. Some sources report that the mills will again enter the market during February for their future requirements.

Reminder — Annual convention, Institute of Scrap Iron & Steel, opens at the Hotel Statler, Washington, Jan. 22.

This week the price of No. 1 steel remained unchanged in Pittsburgh, Chicago and Philadelphia. However, the top quotation of No. 1 steel was off $1.00 in Youngstown, Cleveland and St. Louis; and in Cincinnati it was off 50¢. THE IRON AGE scrap composite remains unchanged at $26.42 per gross ton.

PITTSBURGH—Opinions were a dime a dozen as to which way the market is going to break from existing price levels. At the moment, however, consumers appear to have the situation pretty well in hand. No. 1 heavy melting held at a top of $30.00 for the fifth straight week. Some scrap interests were banking on a continuation of the coal crisis to force the mills into the market for heavy tonnages.

CHICAGO—The market here remains quiet. While there is little evidence of further weakening, the firmer tone of the past 2 weeks has not yet shown up in higher prices or substantial activity. Interest in blast furnace grades continue, and railroad lists which closed last week showed higher prices on many items.

PHILADELPHIA — The market continued quiet here, but some business was placed by several mills at current quotations. The turnings and low phos markets are quiet. Yard cast is reported to be freely available at $32.00. But there is some possibility that the reentry of one mill into the cast market may exert a strengthening effect on the market. Price changes this week include a $1.00 drop in malleable and a narrower spread in cut rails.

NEW YORK — The market remains quiet here with a little more activity than during the previous weeks. Mills are accepting shipments but the movement of material is not up to par for this time of the year. Prices have again reached a range where there is little profit for the yard operator. Some foundries have been coming into the market and it is expected that before the end of the month more will again be buying to replenish their inventories. There is little activity in clean cast chemical borings for the present. No. 2 bundles which have recently been a headache to some mills are off 75¢ for the week.

DETROIT—For the first time in several months scrap prices are holding here for all grades at the levels reported the previous week. There is no local mill buying at the moment although some scrap, it is reported, has been shipped out of town. Some sources see the makings of a fairly strong market here based on the following premises: (1) Auto schedules are being stepped up; (2) industrial lists will close strong this month; (3) some mill buying is anticipated in February. Offsetting the bullish factors are the large volume of industrial scrap being generated during January, tending to discount still further run-of-mill dealer material.

CLEVELAND—A confused and unsettled scrap market prevailed here and in the Valley following purchase last week of No. 1 steel at $30.00 and No. 2 steel at $28.00 by a Valley consumer. For dealer material this is the market. But for industrial grades and railroad tonnage brokers are offering from $1.00 to $2.00 more. Blast furnace grades are not showing their usual coal crisis strength and brokers are covering their orders without serious difficulty. Otherwise the market is inactive.

BOSTON—Prices were unchanged in a listless market. There have been a few small sales at last week's No. 1 heavy melting steel price but there is absolutely no interest in No. 2 bundles and if their price moves soon it will be downward. Cast is just about as dull as it has been for the past year.

BUFFALO—An increased number of rejections in shipments is coupled with weaker tendencies in the scrap market. With liberal reserve stock piles, leading mill consumers are in a position to be more fussy about shipments. Dealers, however, are complaining about the additional handling costs and are more careful in selecting material for shipment against old orders. The major complaint of mills is over tin cans which are being worked into bundles.

CINCINNATI—Prices were off in a weak and inactive scrap market here. Limited tonnages of No. 1 heavy melting are moving at $26.00 but demand for other grades, particularly No. 2 bundles and No. 2 steel, is practically nonexistent in a buyers' market. Dealers can move their No. 1 steel but are unable apparently to sell their big yard inventories of the No. 2 grades and are trying to make package deals with little success. With large tonnages overhanging the market here, and mills pretty well filled up, prospects for higher prices in the next few weeks are dim.

BIRMINGHAM—A car now and then is the extent of trading in this market. In the absence of demand for any grade, prices are nominal. Both mills and foundries have large inventories and scrap supplies in the southeast available for sale are reported to be the heaviest in the past 10 years.

ST. LOUIS—Foundry business in the St. Louis industrial district is dull, resulting in lower prices for their grades of scrap iron. Steel mills are comfortably fixed with inventories and no buying is expected until the middle of February so that dealers are preparing to attend the institute meeting without worry as to what will happen while they are gone. Shipments are tapering off as completion of high price orders nears.

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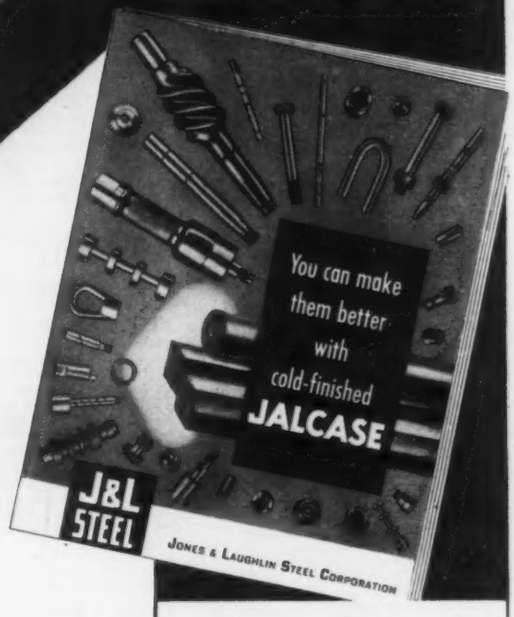

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Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 bundles	29.50 to 30.00
No. 2 bundles	23.50 to 24.00
Machine shop turn.	20.50 to 21.00
Mixed bor. and ms. turns.	20.50 to 21.00
Shoveling turnings	24.50 to 25.00
Cast iron borings	24.50 to 25.00
Low phos. plate	32.00 to 32.50
Heavy turnings	26.00 to 27.00
No. 1 RR, hvy, melting	31.50 to 32.00
Scrap rails, random lght.	35.50 to 36.50
Rails 2 ft and under	38.00 to 39.00
RR. steel wheels	34.50 to 35.00
RR. spring steel	34.50 to 35.00
RR. couplers and knuckles	34.50 to 35.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00
Malleable	33.00 to 34.00

Chicago

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 factory bundles	26.00 to 27.00
No. 1 dealers' bundles	22.00 to 23.00
No. 2 dealers' bundles	20.00 to 21.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	31.00 to 32.00
Low phos. plate	29.00 to 30.00
No. 1 RR. hvy. melting	30.00 to 31.00
Scrap rails, random lgth.	35.00 to 36.00
Rerolling rails	40.00 to 41.00
Rails 2 ft and under	38.00 to 39.00
Locomotive tires, cut	33.00 to 34.00
Cut bolsters & side frames	31.00 to 32.00
Angles and splice bars	31.00 to 32.00
RR. steel car axles	42.00 to 44.00
RR. couples and knuckles	32.00 to 33.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 agricul. cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00
RR. grate bars	29.00 to 30.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	37.00 to 38.00
Malleable	36.00 to 37.00

Philadelphia

No. 1 hvy. melting	$22.50 to $23.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	22.50 to 23.50
No. 2 bundles	17.50 to 18.50
Machine shop turn.	15.50 to 16.50
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.50 to 17.00
Low phos. punchings, plate	25.50 to 26.50
Low phos. 6 ft and under	24.50 to 25.50
Low phos. bundles	24.50 to 25.50
Hvy. axle forge turn.	22.50 to 23.50
Clean cast chem. borings	28.00 to 29.00
RR. steel wheels	28.00 to 29.00
RR. spring steel	28.00 to 29.00
Rails 18 in. and under	37.00 to 38.00
No. 1 machinery cast.	36.00 to 38.00
Mixed yard cast.	31.00 to 32.00
Heavy breakable cast.	33.00 to 34.00
Cast iron carwheels	37.00 to 38.00
Malleable	38.00 to 39.00

Cleveland

No. 1 hvy. melting	$27.00 to $27.50
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	27.00 to 27.50
No. 1 bundles	27.00 to 27.50
No. 2 bundles	22.50 to 23.00
Machine shop turn.	18.00 to 18.50
Mixed bor. and turn.	19.50 to 20.00
Shoveling turnings	19.50 to 20.00
Cast iron borings	19.50 to 20.00
Low phos. 2 ft and under	28.50 to 29.00
Steel axle turn.	26.00 to 26.50
Drop forge flashings	27.00 to 27.50
No. 1 RR. hvy. melting	31.50 to 32.00
Rails 3 ft and under	42.00 to 43.00
Rails 18 in. and under	43.00 to 44.00
No. 1 machinery cast.	42.00 to 43.00
RR. cast	42.00 to 43.00
RR. grate bars	30.00 to 31.00
Stove plate	34.00 to 35.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 bundles	29.50 to 30.00
No. 2 bundles	$24.50 to $25.00
Machine shop turn.	19.50 to 20.00
Shoveling turnings	22.00 to 22.50
Cast iron borings	22.00 to 22.50
Low phos. plate	30.50 to 31.00

Buffalo

No. 1 hvy. melting	$27.50 to $28.00
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	25.50 to 26.00
No. 1 bundles	26.50 to 27.00
No. 2 bundles	24.00 to 24.50
Machine shop turn.	18.00 to 18.50
Mixed bor. and turn	19.00 to 19.50
Shoveling turnings	20.50 to 21.00
Cast iron borings	19.50 to 20.00
Low phos. plate	29.00 to 29.50
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	38.50 to 39.00
RR. steel wheels	33.00 to 33.50
RR. spring steel	33.00 to 33.50
RR. couplers and knuckles	33.00 to 33.50
No. 1 machinery cast	36.00 to 36.50
No. 1 cupola cast.	33.50 to 34.00
Stove plate	32.50 to 33.00
Small indus. malleable	30.00 to 30.50

Birmingham

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	24.00
No. 2 bundles	22.00
No. 1 busheling	24.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00
Bar crops and plate	28.00 to 29.00
Structural and plate	28.00 to 29.00
No. 1 RR. hvy. melt.	26.00 to 27.00
Scrap rails, random lgth.	30.00 to 31.00
Rerolling rails	33.00 to 35.00
Rails 2 ft and under	35.50 to 36.00
Angles & splice bars	35.00 to 36.00
Std. steel axles	28.00 to 29.00
No. 1 cupola cast.	36.00 to 37.00
Stove plate	29.00 to 30.00
Cast iron carwheels	28.00 to 29.00

St. Louis

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 bundled sheets	25.00 to 26.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Rails, random lengths	32.00 to 33.00
Rails 3 ft and under	36.00 to 37.00
Locomotive tires, uncut	27.00 to 28.00
Angles and splice bars	34.00 to 35.00
Std. steel car axles	37.00 to 38.00
RR. spring steel	30.00 to 31.00
No. 1 machinery cast.	36.00 to 37.00
Hvy. breakable cast.	30.00 to 31.00
Cast iron brake shoes	27.00 to 29.00
Stove plate	27.00 to 28.00
Cast iron car wheels	34.00 to 35.00
Malleable	28.00 to 30.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy, melting	$19.00 to $19.50
No. 2 hvy, melting	17.50 to 18.00
No. 2 bundles	15.75 to 16.25
Machine shop turn.	10.50 to 11.00
Mixed bor. and turn.	10.50 to 11.00
Shoveling turnings	11.50 to 12.00
Clean cast chem. bor.	23.00 to 24.00
No. 1 machinery cast.	27.50 to 28.50
Mixed yard cast.	26.50 to 27.00
Charging box cast.	26.50 to 27.00
Heavy breakable cast.	26.50 to 27.00
Unstrp. motor blocks	22.00 to 23.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy, melting	$18.00 to $18.50
No. 2 hvy, melting	16.50 to 17.00
No. 1 bundles	18.00 to 18.50
No. 2 bundles	$13.50 to $14.00
Machine shop turn.	9.50 to 10.00
Mixed bor. and turn.	9.50 to 10.00
Shoveling turnings	12.00 to 12.50
No. 1 busheling	16.50 to 17.00
Clean cast chem. borings	18.00 to 18.50
No. 1 machinery cast.	32.00 to 34.00
No. 2 machinery cast.	28.00 to 29.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy, melting	$21.00 to $22.00
No. 2 hvy, melting	19.00 to 20.00
No. 1 bundles	23.00 to 24.00
New busheling	22.00 to 23.00
Flashings	22.00 to 23.00
Machine shop turn.	14.00 to 14.50
Mixed bor. and turn.	14.00 to 14.50
Shoveling turnings	15.50 to 16.00
Cast iron borings	15.50 to 16.00
Low phos. plate	23.00 to 24.00
No. 1 cupola cast.	32.00 to 33.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	27.00 to 28.00
Automotive cast.	34.00 to 35.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$25.50 to $26.00
No. 2 hvy. melting	21.50 to 22.00
No. 1 bundles	25.50 to 26.00
No. 2 bundles	17.50 to 18.00
Machine shop turn.	12.50 to 13.00
Mixed bor. and turn.	12.50 to 13.00
Shoveling turnings	15.50 to 16.00
Cast iron borings	15.50 to 16.00
Low phos. 18 in. under	32.00 to 32.50
Rails, random lengths	32.00 to 33.00
Rails, 18 in. and under	40.00 to 41.00
No. 1 cupola cast	35.00 to 36.00
Hvy. breakable cast	31.00 to 32.00
Drop broken cast	40.00 to 41.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn	9.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast.	$30.00 to 33.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$34.50 to 37.00

Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft. and under	$25.00 to 28.00
RR. hvy. melting	19.00
No. 1 cupola cast	30.00
Heavy breakable cast.	20.00

Hamilton, Ont.

No. 1 hvy. melting	$24.00
No. 1 bundles	16.00
No. 2 bundles	16.00
Mechanical bundles	22.00
Mixed steel scrap	20.00
Mixed bor. and turn.	18.00
Rails, remelting	24.00
Rails, rerolling	27.00
Bushelings	18.50
Bush., new fact, prep'd	22.00
Bush., new fact, unprep'd	17.00
Short steel turnings	18.00
Cast scrap	$40.00 to 43.00

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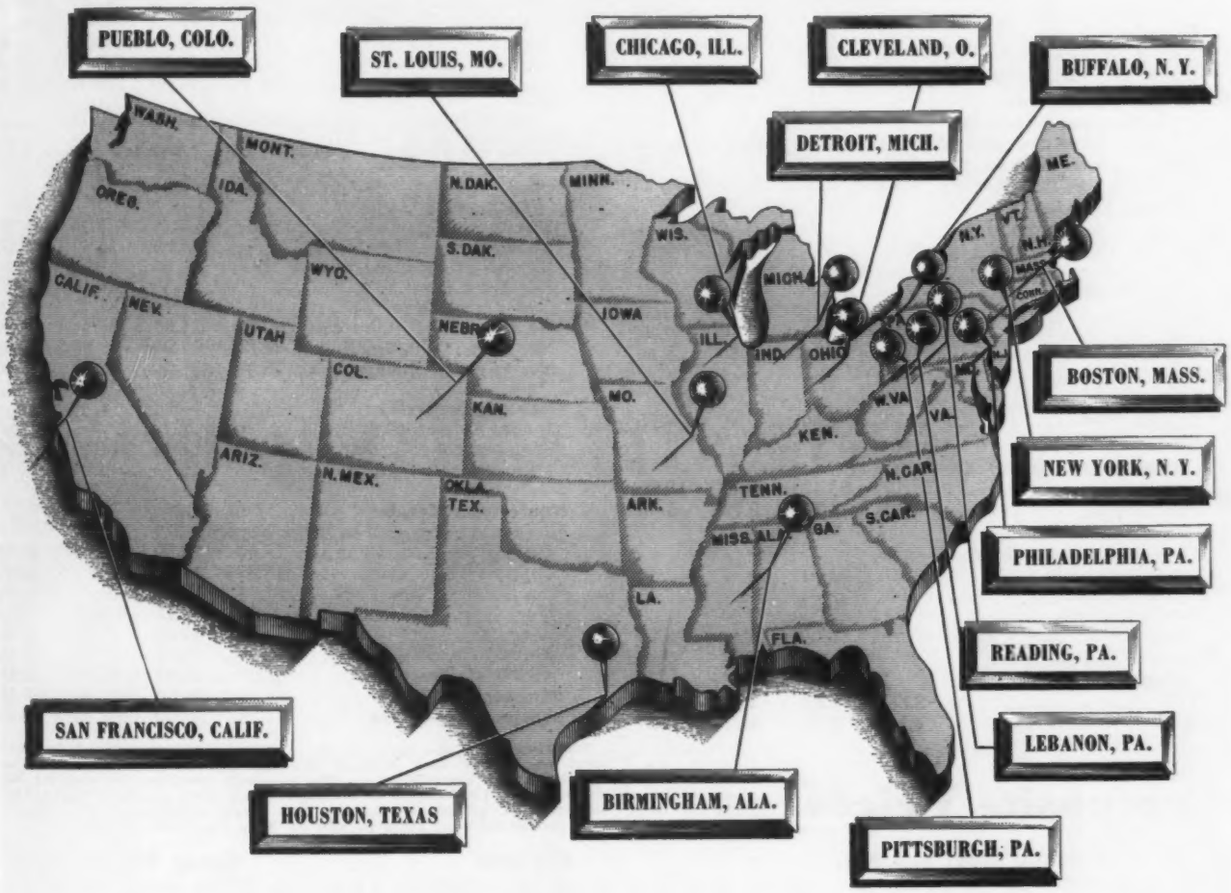

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Jan. 17, 1950	Jan. 10, 1950	Dec. 20, 1949	Jan. 18, 1949
Hot-rolled sheets	3.35	3.35	3.35	3.26
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.21	4.21	4.18	4.063
Plates	3.50	3.50	3.50	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.75	$7.75
Tinplate, electro (0.50 lb.)	6.60	6.60	6.70	6.70
Special coated mfg. ternes	6.50	6.50	6.65	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.256
Rails: (dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.619
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Jan. 17, 1950	Jan. 10, 1950	Dec. 20, 1949	Jan. 18, 1949
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$51.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	47.08	46.08	46.08	49.46
No. 2, Birmingham	40.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	50.76
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	161.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$29.75	$29.75	$29.75	$40.75
Heavy melt'g steel, Phila.	23.00	23.00	24.50	42.50
Heavy melt'g steel, Ch'go	26.50	26.50	26.50	39.50
No. 1 hy. com. sh't, Det.	23.50	23.50	26.50	38.00
Low phos. Young'n	*30.75*	31.75	31.75	47.00
No. 1, cast, Pittsburgh	37.50	37.50	38.50	64.00
No. 1, cast, Philadelphia	37.00	37.00	38.00	57.00
No. 1, cast, Chicago	38.50	38.50	38.50	53.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.00	$14.00	$14.00	$17.00
Foundry coke, prompt	15.75	15.75	15.75	17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	18.50	18.50	18.50	23.50
Copper, Lake Conn.	18.625	18.625	18.625	23.625
Tin Straits, New York	*76.25*	77.00	78.25	$1.03
Zinc, East St. Louis	9.75	9.75	9.75	17.50
Lead, St. Louis	11.80	11.80	11.80	21.30
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	*28.75*	32.00	32.00	35.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Jan. 17, 1950	3.837¢ per lb.	$46.05 per gross ton	$26.42 per gross ton
One week ago	3.837¢ per lb.	45.88 per gross ton	26.42 per gross ton
One month ago	3.836¢ per lb.	45.88 per gross ton	26.92 per gross ton
One year ago	3.720¢ per lb.	46.87 per gross ton	40.92 per gross ton

	Finished Steel High			Finished Steel Low			Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1950	3.837¢	Jan.	3	3.837¢	Jan.	3	$46.05	Jan. 17	$45.88	Jan. 3	$26.42	Jan. 10	$26.25	Jan. 3
1949	3.837¢	Dec.	27	3.705¢	May	3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July	27	3.193¢	Jan.	1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July	29	2.848¢	Jan.	1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec.	31	2.464¢	Jan.	1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May	29	2.396¢	Jan.	1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢			2.396¢			$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢			2.396¢			23.61		23.61		$19.17		$19.17	
1942	2.396¢			2.396¢			23.61		23.61		19.17		19.17	
1941	2.396¢			2.396¢			$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan.	2	2.24107¢	Apr.	16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan.	3	2.26689¢	May	16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan.	4	2.27207¢	Oct.	18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar.	9	2.32263¢	Jan.	4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec.	28	2.05200¢	Mar.	10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1935	2.07642¢	Oct.	1	2.06492¢	Jan.	8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1932	1.89196¢	July	5	1.83901¢	Mar.	1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1929	2.31773¢	May	28	2.26498¢	Oct.	29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

ALTER

BIG ENOUGH FOR *"BIG BUSINESS"*
– PERSONAL ENOUGH FOR *SMALL*

IRON AND STEEL
SCRAP

ALL GRADES OF
STAINLESS and ALLOY SCRAP

Cast Iron
Electric Furnace Grades
Open Hearth
Foundry Steel
Sheet Iron for Baling
Stainless Steel
Non-Ferrous Metals

Over 50 Years
ALTER
COMPANY

1700 ROCKINGHAM ROAD DAVENPORT 2, IOWA

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 31
Alloy net ton	$51.00 1.17													$51.00 31
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00 1	$53.00 1	$53.00 1				$57.00 13		$53.00 3	$58.00 26	$53.00 3			
Carbon forging billets, net ton	$63.00 1	$63.00 1.4	$63.00 1.8	$63.00 4			$63.00 25		$63.00 3.4	$65.00 26	$63.00 3			$63.00 31
Alloy, net ton	$66.00 1.17	$66.00 1.4	$66.00 1		$66.00 4.42		$66.00 13	$66.00 3	$66.00 3.4	$66.00 26	$66.00 3			$66.00 31
SHEET BARS							$57.00 13							
PIPE SKELP	3.15 1.5						3.15 1.4							
WIRE RODS	3.85 2.18	3.85 2.4.33	3.85 6	3.85 2			3.85 6				3.85 3	3.85 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35 1.5.9.15	3.35 23	3.35 1.6.8	3.35 4.5			3.35 1.4.6.13		3.35 3	3.45 26		3.35 3		3.55 12
Cold-rolled	4.10[1.5] 7.9.15.63		4.10 1.6.8	4.10 4.15		4.10 7	4.10 4.6		4.10 3			4.10 3	4.30 22	4.30 12
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.65[24] 5.65[14]					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4		4.40 7	4.40[6] 4.90[16]						4.60 22	4.70 12
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7	4.80 64							
Hi Str. low alloy, h.r.	5.05 1.5.9	5.05 1	5.05 1.6.8	5.05 4.5			5.05 1.4.6.13		5.05 3	5.05 26		5.05 3		5.25 12
Hi Str. low alloy, c.r.	6.20 1.5.9		6.20 1.6.8	6.20 4.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
Hi Str. low alloy, galv.	6.75 1			6.75 4	6.75 4							6.75 3		
STRIP Hot-rolled (over 6 in.)	3.25 5.7.9.28	3.25 3.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 12.47
Cold-rolled	4.15 5.7.9.63	4.30 8.66	4.30 8	4.15 2.5		4.15 7	4.15 4.6.13.40.48.49		4.15 3			4.15 3		4.40[68.81] 4.35[12.47]
Hi Str. low alloy, h.r.	4.95 9		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 13
Hi Str. low alloy, c.r.	6.20 9			6.05 2.5			6.05 4.6.13		6.05 3			6.05 3		6.40 12
TINPLATE† Cokes, 1.50-lb. base box 1.25 lb, deduct 20¢	$7.50 1.5.9.15		$7.50 1.6.8				$7.50 4					$7.60 3	$7.70 22	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6				5.30 4					5.40 3	5.50 22	
BARS Carbon steel	3.45 1.5.9.17	3.45 1.4.23	3.45 1.6.8	3.45 4	3.45 4		3.45 1.4.6		3.45 3.4		3.45 3			3.65 12
Reinforcing‡	3.45 1.5	3.45 4	3.45 1.6.8	3.45 4	3.45 4		3.45 1.4.6		3.45 3.4		3.45 3	3.45 3		
Cold-finished	4.10[5] 4.15[2.4] 17.52.69.71	4.15[2] 23.69.70	4.15 4.73.74	4.15 2.61	4.15 4.22 4.15[52]		4.15 6.40.57		4.15 70					4.39 12
Alloy, hot-rolled	3.95 1.17	3.95 1.4.23	3.95 1.6.8		3.95 4		3.95 1.6.25	3.95 3	3.95 3.4		3.95 3			4.25 12
Alloy, cold-drawn	4.85 17.52.69.71	4.90 23.69.70	4.90 4.73.74	4.90 61	4.90 4.42.82		4.90 6.25.57	4.90 3	4.90 3.70					
Hi Str. low alloy, h.r.	5.20 1.5		5.20 1.6.8	5.20 4			5.20 1.6	5.20 3	5.20 3		5.20 3			5.40 12
PLATE Carbon Steel	3.50 1.5	3.50 1	3.50 1.6.8	3.50 4			3.50 13		3.50 3	3.60 26	3.50 3	3.50 3		3.75 12
Floor plates	4.55 1	4.55 1	4.55 3	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi Str. low alloy	5.35 1.5	5.35 1	5.35 1.3	5.535 4.5			5.35 6			5.35 26	5.35 3	5.35 3		5.80 13
SHAPES, Structural	3.40 1.5.9	3.40 1.23	3.40 1.6.8					3.45 3	3.45 3		3.45 3			
Hi Str. low alloy	5.15 1.5	5.15 1	5.15 1.6.8				5.15 6	5.15 3	5.15 3		5.15 3			
MANUFACTURERS' WIRE Bright	4.50 2.5.18	4.50 4.12.33.34		4.50 2.77			4.50 6	Kokomo—4.60[3.9]			4.50 3	4.60 3		Duluth—4.50[2] Pueblo—4.75[14]
PILING, Steel sheet	4.20[1] 4.05[9]	4.20 1							4.20 3					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging, net ton
	$59.00 83				Alloy, net ton
		$53.00 11	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00 83	$63.00 11	F=$82.00[19]	Geneva=$61.00[16]	Carbon forging billets, net ton
	$74.00 83		F=$82.00[19]		Alloy net ton
				Portsmouth=$55.00[20]	SHEET BARS
					PIPE SKELP
	4.25 83	3.85 11	SF, LA=4.65[24] LA=4.20[62]	Portsmouth=3.85[20] Worcester=4.15[2]	WIRE RODS
		3.35 4,11	SF, LA=4.05[24] F=4.25[19]	Ashland[7]=3.35 Niles=3.50[61]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10 11	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40 4,11	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.05 11	F=6.74[19]		Hi Str. low alloy, h.r.
			F=7.10[19]		Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 83	3.65 83	3.25 11	SF, LA=4.00[62] F=4.40[19] S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.40[19] LA=5.50[27]	New Haven=4.65[2,68]	Cold-rolled
		4.95 11	F=6.64[19]		Hi Str. low alloy, h.r.
			F=6.95[19]		Hi Str. low alloy, c.r.
		$7.60 11	SF=$8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05 83	3.85 83	3.45 4,11	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05 83	3.85 83	3.45 4,11	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55 83	4.35 83		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=4.95 Hartford=5.20[4]	Alloy, cold-drawn
		5.20 4,11	F=6.25[19]		Hi Str. low alloy, h.r.
	3.90 83	3.50 4,11	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.60[29] Coatesville=3.60[21] Harrisburg=3.50[35]	PLATE Carbon steel
				Harrisburg=4.55[35]	Floor plates
			F=5.40[19]	Coatesville=4.50[21]	Alloy
		5.35 11	F=5.95[19]	Geneva=5.35[16]	Hi Str. low alloy
4.00 83	3.80 83	3.40 11	SF=3.95[62] LA=4.00,[24,63]	Phoenixville=3.30[56] Geneva=3.40[16]	SHAPES, Structural
		5.15 11	F=4.00[19] S=4.05[62]	Fontana=5.75[19]	Hi Str. low alloy
5.10 83	4.90 83	4.50 4,11	SF, LA=5.45[24] LA=5.10[62]	Portsmouth=4.50[20] Worcester=4.80[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes, deduct $1.00 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	106	125
Woven wire fence†	116	139
Fence posts, carloads††	112	...
Single loop bale ties	113	137
Galvanized barbed wire**	126	146
Twisted barbless wire	126	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$5.15	$6.10
Annealed, galv. fencing‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

PRODUCING POINTS — *Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Wareham, Mass., 53.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct, Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon 10 pct, Coatesville, (26)	27.50	
Inconel-carbon 10 pct, Coatesville, (21)	36.00	
Monel-carbon 10 pct, Coatesville, (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		$1.40
Aluminized steel sheets, hot dip, Butler, Pa., (7)		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	†6.45
Electrical	†*6.95
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*, add 20¢; Indiana Harbor, Ind., 8†, deduct 25¢; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. shorter	26	37
All diam., longer than 6 in.	22	34
Lag, all diam over 6 in. & longer	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 & ⅝ in.	36	30	36
¾ to 1½ in. inclusive	31	27	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

Pct Off List

Packaged, steel, plain finish..63½ and 10
Packaged, plated finish .....50 and 10
Bulk, plain finish** 72*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. $7.25

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter (SAE 1035) heat treated	54
Milled studs	28
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.15¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.35
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Tie plates, Pittsburgh, Torr., Calif.*	4.35
Track bolts, untreated	8.85
Track bolts, heat treated, to railroads	9.10

* Seattle, add 30¢.
† Kansas City, 5.60¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburgh, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.50 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$15.50 to $16.00
Foundry, oven coke	
Buffalo, del'd	$20.90
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$20.25 to 21.04
Cleveland, del'd	22.62
Cincinnati, del'd	21.71
St. Paul, f.o.b.	23.50
St. Louis, del'd	21.60
Birmingham, del'd	18.75

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$37.00
60% or less	34.00

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	38.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

Numbers correspond to producers. See Key on Steel Price Page.

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

REFRACTORIES (*F.o.b. works*)

Fire Clay Brick *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $86.00
No. 1 Ohio 80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.. 80.00
No. 2 Ohio 72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 14.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $86.00
Childs, Pa. 90.00
Hays, Pa. 91.00
Chicago District 95.00
Western, Utah and Calif. 101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago 106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 15.00
Silica cement, net ton, bulk, Hays, Pa. 17.00
Silica cement, net ton, bulk, Ensley, Ala. 16.00
Silica cement, net ton, bulk, Chicago District 16.00
Silica cement, net ton, bulk, Utah and Calif. 22.50

Chrome Brick *Per Net Ton*

Standard chemically bonded, balt., Chester $69.00

Magnesite Brick

Standard, Baltimore $91.00
Chemically bonded, Baltimore 80.00

Grain Magnesite *Std. ¾-in. grains*

Domestic, f.o.b. Baltimore, in bulk, fines removed .. $56.00 to $56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines ..... 30.50 to 31.00
in sacks with fines ..... 35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢ ... $12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags ... 7.4¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots ..... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 31.5¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe ..... 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe .. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8+% Fe 90.0¢ to $1.75
Aluminum ..... 29.00¢
Antimony ..... 45.78¢
Brass, 10 ton lots ..... 23.25¢ to 26.75¢
Copper, electrolytic ..... 28.625¢
Copper, reduced ..... 28.50¢
Cadmium $2.40
Chromium, electrolytic, 99% min. $3.50
Lead ..... 18.50¢
Manganese ..... 55.00¢
Molybdenum, 99% $2.65
Nickel, unannealed ..... 61.00¢
Nickel, spherical, minus 30 mesh, unannealed ..... 68.00¢
Silicon ..... 34.00¢
Solder powder ..... 8.5¢ plus metal cost
Stainless steel, 302 ..... 75.00¢
Tin ..... 89.00¢
Tungsten, 99% $2.90
Zinc, 10 ton lots ..... 15.50¢ to 18.25¢

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
GRAPHITE		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
CARBON		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, T & C

Steel, buttweld*	Black	Galv
⅛-in.	40½ to 38½	24 to 22
¾-in.	43½ to 41½	28 to 26
1-in.	46 to 44	31 to 29
1¼-in.	46½ to 44½	31½ to 29½
1½-in.	47 to 45	32 to 30
2-in.	47½ to 45½	32½ to 30½
2½ to 3-in.	48 to 46	33 to 31
Steel, lapweld		
2-in.	37	23½ to 21½
2½ to 3-in.	41 to 40	25½ to 24½
3½ to 6-in.	44 to 40	28½ to 24½
Steel, seamless		
2-in.	36	20½
2½ to 3-in.	39	23½
3½ to 6-in.	41	25½
Wrought Iron, buttweld		
⅛-in.	+26½	+53
¾-in.	+16½	+42
1 & 1¼-in.	+10½	+33
1½-in.	+ 4½	+29½
2-in.	+ 4	+29
Wrought Iron, lapweld		
2-in.	+13½	+37
2½ to 3½-in.	+11	+32½
4-in.	+ 6	+26½
4½ to 8-in.	+ 8	+28
9 to 12-in.	+18	+37½

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	39½ to 37½	24½ to 22½
¾-in.	43½ to 41½	28½ to 26½
1-in.	45½ to 43½	31½ to 29½
1¼-in.	46 to 44	32 to 30
1½-in	46½ to 44½	32½ to 30½
2-in	47 to 45	33 to 32
2½ to 3-in.	47½ to 45½	33½ to 31½
Steel, lapweld		
2-in.	37 to 36	22½ to 21½
2½ to 3-in.	42 to 40	27½ to 25½
3½ to 6-in.	45½ to 41½	31 to 29
Steel, seamless		
2-in	35	20½
2½ to 3-in.	39	24½
3½ to 6-in.	42½	28
Wrought Iron, buttweld		
⅛-in.	+22	+47
¾-in.	+15½	+40
1 to 2-in.	+ 5½	+29
Wrought Iron, lapweld		
2-in.	+10½	+33½
2½ to 4-in.	+ 1	+22
4½ to 6-in.	+ 5	+26½
7 & 8-in.	list	+21½
9 to 12-in.	+11½	+29½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$20.61	$24.24	$19.99	$23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

CAST IRON WATER PIPE

Per net ton

6 to 20-in., del'd Chicago $95.70
6 to 24-in., del'd N. Y. ..... $92.50 to 97.40
6 to 24-in., Birmingham 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 109.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 20c to base price except Birmingham, Cincinnati, New Orleans and Philadelphia (*), add 15c).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.05	6.24–6.44[1]	6.46–6.48[2]	5.59–5.59[11]	....	5.20–5.84[11]	5.49	5.49–5.49[11]	6.19	....	10.05	....	....
Birmingham*	5.05[10]	5.80	6.15[7]	5.10[10]	....	5.20	5.05	5.00[10]	6.73	....	....	....	....
Boston	5.73	6.48[20]–6.85	6.97–7.24	5.78	6.90–6.95	5.88	5.55	5.60	6.02–6.58	9.70–9.97	9.93–10.37	11.15	11.45
Buffalo	5.05	5.80	6.80	5.41	7.27	5.45	5.15	5.05	5.65	9.60	9.90	11.05	11.35
Chicago	5.05	5.80	6.70	5.10	5.45–6.16	5.20	5.05	5.00	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.32–5.40	5.80–6.15	6.29	5.49	....	5.59	5.44	5.39	6.10	9.60	9.90	11.05	11.35
Cleveland	5.05	5.80	6.95	5.24	6.35	5.32	5.17	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08	7.09	5.49	6.27–6.58	5.59	5.44	5.39	6.03	9.56	9.86	11.01	11.31
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....
Indianapolis	....	....	....	....	7.36	....	....	....	....	....	....	....	....
Kansas City	....	....	....	....	6.95	....	....	....	....	....	....	....	....
Los Angeles	....	....	....	....	7.35	....	....	....	....	....	....	....	....
Memphis	5.93	6.68	....	5.98	6.80	6.08	5.93	5.68	....	....	....	....	....
Milwaukee	5.19	5.94	6.84	5.24	6.32	5.34	....	5.14	5.89	9.39	9.69	10.84	11.14
New Orleans*	....	....	....	....	....	....	....	....	....	....	....	....	....
New York	5.55–5.65	6.54–6.64	6.90–7.00	5.84	6.76	5.70	5.45	5.65	6.44	9.80	9.90	11.05	11.35
Norfolk	6.10	7.00	....	6.30	....	6.15	6.20	6.15	7.20	....	....	....	....
Omaha	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia*	5.30	6.20	6.70	5.65	6.29	5.45	5.25	5.50	6.31	9.35	9.65	10.80	11.10
Pittsburgh	5.05	5.80	6.70	5.20	6.00	5.20	5.05	5.00	5.75	9.25	9.55	10.70	11.00
Portland	....	....	....	....	....	....	....	....	....	....	....	....	....
Salt Lake City	....	....	....	....	....	....	....	....	....	....	....	....	....
San Francisco	6.25[11]	7.60[2]	7.50[2]	6.75[11]	8.25	6.15[11]	6.00	6.15[11]	7.80	....	....	....	....
Seattle	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Louis	5.38	6.13	7.03	5.43	6.68–7.54	5.53	5.38	5.33–5.35	6.08	9.58	9.88	11.03	11.33
St. Paul	....	....	....	....	6.82	....	....	....	....	....	....	....	....

BASE QUANTITIES: (*Standard unless otherwise keyed on prices*).

Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 1000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	{38.88–41.88	{39.38–42.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.00
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	46.88	47.08	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.38	50.38	50.88	51.38	51.88	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contact base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolysic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Manganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.00
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered ,60% chromium.

Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	$1.09
0.50% max. C	1.05
9.00 min. C	1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.13
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrocanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Ton lots, packed, lump	11.75¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

Boron Agents

Contract prices, per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25
Bortam, f.ob. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed. Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese—Boron 75.00% Mn. 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢

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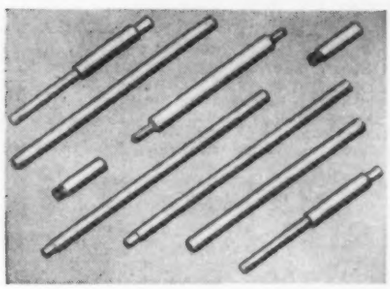

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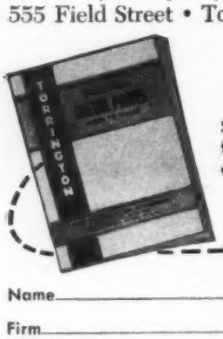

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Iron Age *Introduces*

Continued from Page 23

William P. Kirk, vice-president and sales manager, machine tools of NILES-BEMENT-POND CO., West Hartford, Conn., has retired from active participation in the sales program of the company. He will continue to serve in the capacity of consulting engineer and also will represent Pratt & Whitney in certain association work. **Alexander H. d'Arcambal**, vice-president and sales manager, small tools and gages, and consulting metallurgist, has been appointed general sales manager.

ALEXANDER H. d'ARCAMBAL, general sales manager, Niles-Bement-Pond Co.

Orville R. Lyons has been named coal preparation engineer of HEYL & PATTERSON, INC., Pittsburgh. For the last four years, Mr. Lyons has served as research engineer in charge of coal preparation at Battelle Memorial Institute, Columbus, Ohio.

Norman L. Harvey has been appointed director of engineering of COLONIAL RADIO CORP., Buffalo. Mr. Harvey was formerly head of the Applied Research ranch of the Physics Laboratory of Sylvania Electric Products Inc., Bayside, N. Y.

Leonard C. McKesson, Arthur C. Pope, Stanley R. Holmquist and A. J. Whitford have been elected directors of the ANSUL CHEMICAL CO., Marinette, Wis. Mr. McKesson is

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The Torrington Rotary Swaging Machine delivers 4000 hammer blows a minute...reduces, sizes, rounds, points and tapers rod, wire and tubing... work-hardens metal for toughness and resilience...produces a burnished surface... utilizes every bit of stock.

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vice-president in charge of sales, Mr. Pope, vice-president in charge of manufacturing, Mr. Holmquist, treasurer of the company. A. J. Whitford is president of the First National Bank, Marinette, Wis. This is Mr. Whitford's first business connection with the company.

WILLIAM P. HILL, assistant general manager, Bethlehem Steel Co.

William P. Hill has been named assistant general manager of the Sparrow Point plant, BETHLEHEM STEEL CO. Mr. Hill has been with the company since 1933.

Don H. Smith has been named assistant sales promotion manager and **George H. Gruenwald** assistant advertising manager of WILLYS-OVERLAND MOTORS, INC., Toledo. Mr. Smith was formerly with General Motors for 17 years. Mr. Gruenwald joined Willys-Overland from UARCO, INC., Chicago, where he was assistant to the president, in charge of public relations.

Kennedy Davidson was elected president and treasurer of CONSOLIDATED IRON-STEEL MANUFACTURING CO., Cleveland. I. T. Kahn, former president, became chairman of the board.

L. G. Jacques has been named executive vice-president of MOTOR PRODUCTS CORP., Detroit. He formerly served as vice-president and general manager of Motor Products. **D. J. Bracken** and **L. J. Sorenson** become vice-president and general manager of the Automotive Div. and Deepfreeze Div. respectively.

Having SLIDE RULE trouble?

When the problem is moving air or gas, turn to *R-C dual-ability* for accurate, dependable answers

That's one job we know, inside-out. For almost a century, we've been air-and-gas specialists, exclusively. Without being immodest, we think our engineers are the best informed in the industry, on blowers, exhausters, gas pumps and related equipment.

They have an extensive line to draw on, too. They make unbiased recommendations between Centrifugals and Rotary Positives—we're the only company offering this *dual choice*. With capacities ranging from 5 cfm to 100,000 cfm, we can supply standard units closely matched to the job, for efficiency and economy.

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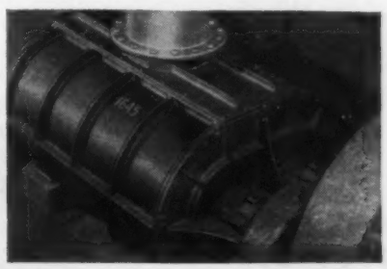
ROOTS-CONNERSVILLE BLOWER CORPORATION
502 Ohio Avenue, Connersville, Indiana

Type H, 4-stage Centrifugal Gas Booster, driven by 240-hp steam turbine. Capacity 7,000 cfm.



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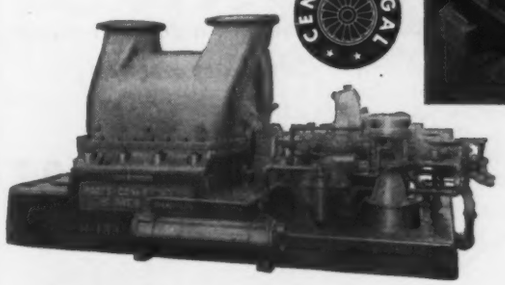

Rotary Positive Cupola Blower with V-Belt drive, for melting gray iron and non-ferrous metals. Capacity 8,600 cfm.

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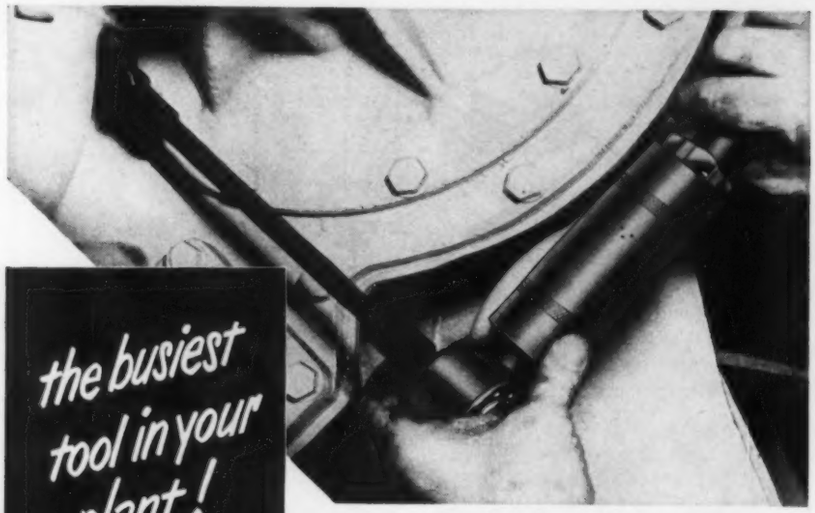

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• On the production line or on maintenance work, the Buckeye Air Wrench is always busy, cutting time and costs on nutsetting jobs. Its rotary vane-type motor provides fast, steady rotation that runs nuts down to exact torque without shock to nut, bolt or operator—and practically eliminates the problem of stripped threads.

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IRON AGE INTRODUCES

Continued

Gustavus J. Esselen has been elected vice-president of the UNITED STATES TESTING CO., INC., Hoboken, N. J. Dr. Esselen will continue in active direction of the Esselen Research Div. of the company.

EDWARD L. WARNER, JR., publicity director, Oldsmobile Div., General Motors Corp.

Edward L. Warner, Jr., has been named publicity director of the Oldsmobile Div., GENERAL MOTORS CORP., Detroit. **John G. Wood** has retired as executive assistant for engineering, and **O. V. Badgley** has retired as vice-president of General Motors and general manager of its Delco-Remy Div. Mr. Badgley will be succeeded in this position by **H. D. Dawson** who has been serving as assistant general manager of the division.

Edward C. La Bart has been appointed district manager of the UNITED STATES STEEL SUPPLY CO., Seattle, and **George R. Coffin** has been named to the same position at Portland. Both men have been assistant district managers in their respective territories since Nov. 1948.

J. C. Kemp, general sales engineer of AMPCO METAL, INC., Milwaukee, has been appointed district manager of Ampco's Chicago office, effective February 1, 1950. Mr. Kemp was formerly sales engineer for the company.

Ross Wilkins, assistant vice-president, has been named general manager of sales of the GREAT LAKES STEEL CORP., Detroit, and **Earl P. Dubois,** has been promoted to assistant vice-president and assistant general

IRON AGE INTRODUCES

Continued

manager of sales. Mr. Wilkins succeeds the late **W. R. Cunnick.** Mr. Wilkins has been with Great Lakes since 1926. Mr. Dubois joined the sales department in 1928 and in 1949 was named manager of sheet sales.

JOHN JEPPSON, works manager, Abrasive Div., Norton Co.

John Jeppson, assistant secretary and a director of NORTON CO., has been made works manager of the abrasive division. **Frank G. Gifford,** manager of wheel plants, will assume Mr. Jeppson's management of plant 7.

William R. H. Eby has been appointed to the newly created position of industrial sales manager of the Pacific Dist. of YORK CORP., York, Pa. Until recently Mr. Eby had been serving as branch manager at Seattle. **C. Mason Gerhart** has been made a sales engineer. Mr. Gerhart was formerly assistant to the commercial sales manager.

J. K. Beidler has been named assistant general manager of the Machinery Div., DRAVO CORP., Pittsburgh. **R. M. Bush** was named manager of sales development; **H. M. Graham,** manager of the Apparatus Dept., and **B. B. Reilly,** manager of the Air Conditioning and Combustion Dept. **G. P. Smith** was appointed purchasing agent to succed Mr. Beidler.

David W. Jones, Jr., will represent **LUKENS STEEL CO.,** Coatesville, Pa., and its divisions in the sale of steel plate and specialty plate products in the Rocky Mountain area.

Aluminum Brazing "ups" production 50%...buckling and distortion eliminated

LARKIN COILS COMPANY, Atlanta, Georgia, manufacturers of industrial cooling units, experienced trouble with distortion and buckling during fabrication of the aluminum drain plug to the main unit.

J. P. Flood and R. P. McCleskey, Airco Technical Sales Representatives, recommended aluminum brazing the drain plug to the unit, using Airco No. 716 Aluminum Brazing Wire and Elite Brazing Flux.

The company followed this suggestion, and found that the speed of the brazing technique increased production over 50%. More important, distortion and buckling was completely overcome — finished welds were excellent, rejects virtually eliminated, and savings were effected in gas and filler wire consumption. The company was extremely pleased with these results.

• • • •

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To assure its customers of high efficiency in all applications of the oxyacetylene flame or electric arc, Air Reduction has available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Ask about this Airco "Plus-Value" service today. Write your nearest Airco office.

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When BTU consumption or volume of excess air is not satisfactory, check the improvements possible with THERM-O-FLAKE. This is the insulation designed especially for open hearth furnaces, and used regularly by most operators on exposed brickwork surfaces such as bulkheads, checker arches, end and side walls.

Open hearth furnaces sealed and insulated with THERM-O-FLAKE show increased operating efficiency due to higher air preheat and higher flame temperature. There is an important increase in thermal efficiency in regeneration. Radiation losses are safely minimized with a reduction in fuel costs.

Write for detailed information on how THERM-O-FLAKE can improve your furnace efficiency and reduce fuel costs.

Illinois Clay Products Company
JOLIET, ILLINOIS

Exclusive Manufacturers of
Therm-O-Flake Insulation

IRON AGE INTRODUCES

Continued

F. A. Laurie and **R. J. Williams** have been named vice-presidents of AMERICAN METAL PRODUCTS CO., Detroit. Mr. Laurie was formerly associated with Ford Motor Co. and Packard Motor Car Co. Prior to joining American Metals in 1936. Williams was associated with the Presto-Lite Div. of Union Carbide Co.

RALPH HANES, director of advertising and sales promotion, Dodge Manufacturing Corp., whose appointment was announced recently in The Iron Age.

Maurice W. Daugherty, chief of the Cleveland Research Div. of ALUMINUM CO. OF AMERICA, Cleveland, will be made secretary of the Aluminum Research Laboratories, New Kensington, Pa. Mr. Daugherty will be replaced in his former position by **Walter E. Sicha. Alan M. Montgomery** will be assistant chief of the Cleveland Research Div.

C. L. Johnston has been appointed manager of sales, Warehouse Div., NICHOLS WIRE & ALUMINUM CO., Davenport, Iowa. **G. J. Brenneman** has been appointed assistant sales manager of the Mill Div. Mr. Johnston has held the positions of sales representative and assistant general sales manager with the company. Mr. Brenneman was formerly associated with the Aluminum Co. of America in Pittsburgh and Chicago.

R. E. Barnett has been promoted to assistant sales manager of MARSH INSTRUMENT CO., Skokie, Ill. Mr. Barnett has been with the Marsh organization for the past 9 years in a sales capacity.

IRON AGE INTRODUCES

Continued

Gerald E. Duffy has been appointed vice-president in charge of traffic for the SANTA FE RAILWAY, Chicago, succeeding **James J. Grogan** who died. Mr. Duffy has been assistant vice-president in charge of traffic at Chicago for the Santa Fe sinse 1944.

THOMAS A. BROWN, assistant manager of operations, Pittsburgh Screw & Bolt Corp.

Thomas A. Brown has been appointed assistant manager of operations of the Pittsburgh and Graham plants of PITTSBURGH SCREW AND BOLT CORP. Mr. Brown was formerly division superintendent of the McDonald Mills of Carnegie-Illinois Steel Corp., Youngstown.

OBITUARIES

George C. Spring, 50, cashier and assistant treasurer of National Tube Co., Pittsburgh, died Dec. 31.

Clarence A. Raftrey, 52, works manager of Cadillac Motor Car Div., died Dec. 30.

S. H. Aiken, director of purchases of the Star Drilling Machine Co., Akron, Ohio, died Dec. 26.

Emerson H. Fairchild, 59, retired from his firm the E. H. Fairchild Co., New Orleans, died Jan. 1.

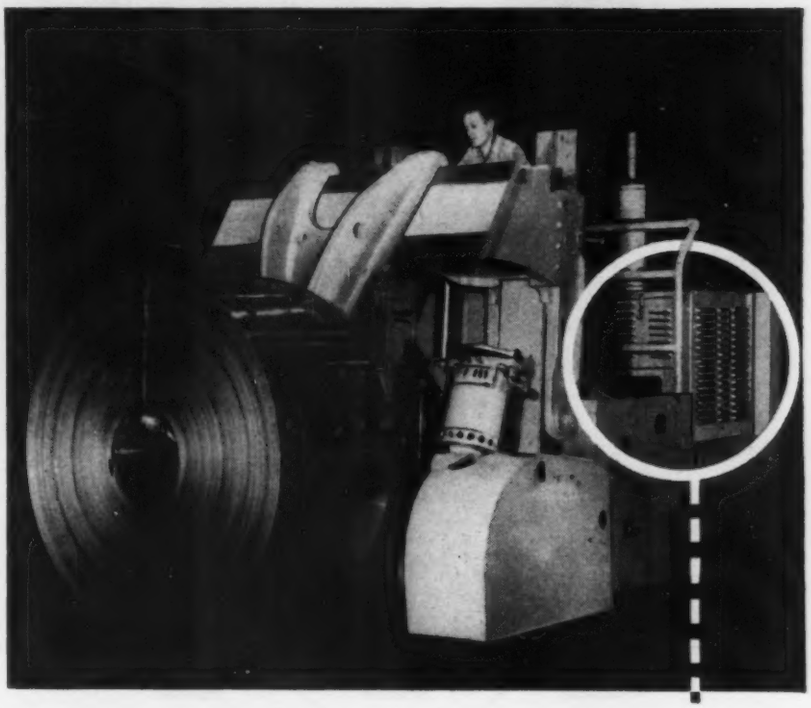
Edward F. Reeser, 59, treasurer, Lehigh Structural Steel Co., Allentown, Pa., died Jan. 7.

Resume Your Reading on Page 24

constant power

FOR THE WORLD'S FASTEST STRIP MILL

Weirton Steel Works, Weirton, W. Va.

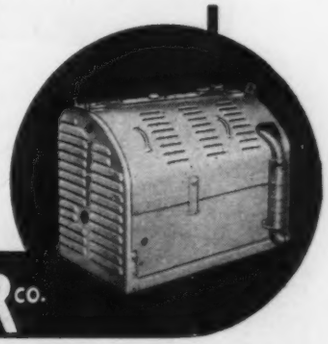


constant power

WITH READY-POWER-EQUIPPED ELECTRIC TRUCKS

Illustrated at top is one of two 2250 HP Motors at the Weirton Steel Works, Weirton, W.Va. furnishing *constant power* to drive the finishing rolls of the world's fastest cold-reduction strip mill capable of mile-a-minute production.

Equally constant and dependable is the power provided by the Ready-Power gas-electric unit on the "Automatic Skylift Giant" electric truck shown carrying one of the mill's 30,000 lb. rolls of finished strip. For electric trucks of any make or type, new or old, where constant power for hour-after-hour operation is needed—specify Ready-Power.



THE READY-POWER CO.

3822 Grand River Ave., Detroit 8, Michigan

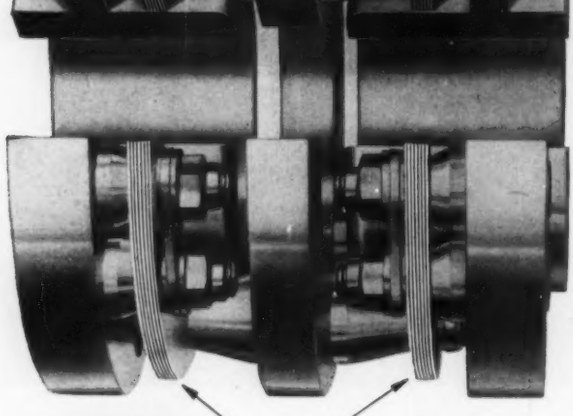
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Dear Editor

A DISCUSSION OF 2% Mn AIR HARDENING STEEL

I have been interested in reading the articles on air hardening tool and die steels written by C. B. Post, Metallurgist of the Carpenter Steel Co., appearing in the issues of Nov. 24 and Dec. 1, 1949. I would like to compliment Mr. Post on doing a very good job from the overall view, but at the same time to take sharp issue with him on one particular point because I am convinced his data is at fault. I refer to the low temperature air hardening type of steel running about 1 pct C, 2 pct Mn, 1 pct Cr, and 1 pct Mo.

Vulcan Crucible Steel Co. made its first commercial heat of this type of steel in 1938. The demand increased rapidly and has held steadily higher than the demand for many older types of tool steel. Our customers like it. On p. 65 of the Nov. 24 issue, Mr. Post makes the following statement in reference to the 2 pct Mn grade:

"In the case of the 1 pct C grade, air hardening from temperatures of 1500° to 1600°F will produce a hardness of Rc 63 to 65 in sizes up to about 2 in. round x 2 in. long; this hardness will drop rapidly for larger sizes. For sizes about 3 in. round x 3 in. long, the hardness as air cooled will be about Rc 60 and about Rc 54 in a 4 in. round x 4 in. long section.

Mild Circulation Advised

Ten years' experience with the 1 pct C grade does not bear out this statement. Additional tests made within the last week confirm that ten years' experience. We took pieces at random from our stock, making the selection purely according to size in order to get the proper spread. It so happened that each sample was from a different heat of steel. The sizes, hardening temperatures, and resulting hardness are tabulated herewith:

Size	Hardening Temp, °F	Quench	Hardness, Rc
2 in. rd. x 2 in.	1550	Still air	63 to 64
		Mild fan air	63 to 64
2⅞ in. rd. x 3 in.	1575	Still air	62 to 63
		Mild fan air	62 to 63
3⅞ in. rd. x 4 in.	1600	Still air	61 to 62
		Mild fan air	61 to 62
5 in. rd. x 5 in.	1600	Still air	61 to 62
		Mild fan air	61 to 62

You will note each size was run in duplicate, one sample being still air cooled while resting on a wire screen. The other resting on another wire

DEAR EDITOR

Continued

screen was cooled in very mild fan air. The fan was an ordinary 10 in. office fan which was between 5 and 10 ft away from the piece. It is interesting to note that there is no difference in the hardness between these pieces. However, we always advise mild fan air if the hardening room is unusually warm or lacks good circulation.

Certainly the preponderance of evidence that we have accumulated over the past years, both from our own many tests and the experience of many customers, contradicts the curves shown in figs. 1 and 6 of Mr. Post's article as they relate to 1 pct C steel of this type, at least as made by Vulcan. Of course, we cannot comment on this type of steel as made by any other manufacturers as our experience has been with our own steel. Mr. Post also says:

"By and large, the 1 pct C, manganese - chromium - molybdenum steels have not found much application as air hardening tool steels except in small sizes, where standard grades of oil hardening nondeforming tool steel can be successfully used."

We have not found this to be true at all. For instance, we have sold many tons of it for large size thread rolling dies, which must have uniform hardness all the way across the face.

Hardens Satisfactorily

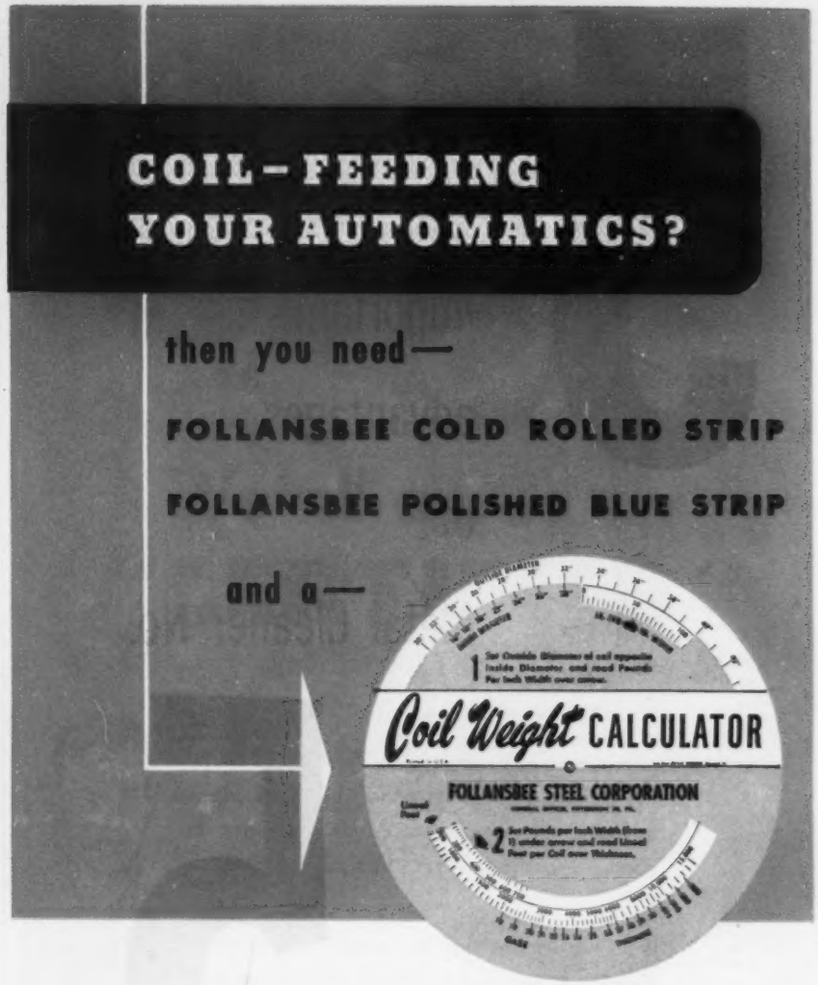
I recall one such die in particular, about 8x2⅝x16 in., which was no good when made from an oil hardening steel of about 0.90 C, 1.60 Mn, 0.25 Si because of insufficient and nonuniform hardness, but which was very satisfactory indeed when the 1 pct C, 2 pct Mn steel was used. I might also point out in the case of small sizes that the lessened warpage and danger of cracking in hardening, as well as longer wear, frequently make it advisable to use this air hardening steel instead of oil hardening.

Mr. Post states that the 0.70 pct C steel is tougher than the 1 pct C—might it not be expected that the 1 pct C would have higher wear resistance? I wish to say that the low hardenability ascribed by Mr. Post to the 1 pct C, 2 pct Mn, 1 pct Cr, 1 pct Mo type of steel is definitely in error because it will harden, without any fancy heat treatment, sufficiently hard to do the large majority of work in sections which cover the vast majority of applications.

A. D. BEEKEN
Metallurgist
Vulcan Crucible Steel Co.
Aliquippa, Pa.

Dr. Post, author of the article "Air Hardening Tool and Die Steels," comments as follows:

"We want to thank Mr. Beeken for calling our attention to an error in our article. This error can be corrected if, on p. 65 of



Here's just the handy calculator you need for determining the weight of the coils of strip you feed into your automatics.

It's a simple device, like a circular slide rule, which gives you essential data for using Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip in your continuous production lines.

Your Follansbee Coil Weight Calculator is ready for mailing. Just fill out this coupon or write us on your business letterhead.

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Pittsburgh 30, Pa.
I could use a coil weight calculator—

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Position_____

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GENERAL OFFICES, PITTSBURGH 30, PA.
COLD ROLLED STRIP • ELECTRICAL SHEETS • POLISHED BLUE SHEETS
SEAMLESS TERNE ROLL ROOFING
Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit; Milwaukee. *Sales Agents*—Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, W. Va., and Toronto, Ohio.
Follansbee Metal Warehouses—Pittsburgh, Pa., [illegible], and Fairfield, Texas.

5 important advantages of Metal Cleaner No. 5

Cleaning with Wyandotte Metal Cleaner No. 5 is a fast, sure, low-cost operation. This versatile product is balanced for top performance in rotary or tumble barrel, rotary washer or low to medium pressure spray washing. And it is well adapted to immersion cleaning or electrocleaning of ferrous and nonferrous metal parts because of these advantages:

1 Wyandotte No. 5 is a free-flowing, all-soluble cleaner.

2 It is well inhibited . . . excellent for cleaning copper alloys under all conditions.

3 It holds its strength in solution, thereby reducing cleaner costs.

4 It has exceptionally fine detergency on all types of soils.

5 It has good rinsing qualities.

For complete technical information on Wyandotte Metal Cleaner No. 5 or any other metal cleaning product in the complete Wyandotte line, just write:

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WYANDOTTE CHEMICALS CORPORATION • Wyandotte, Michigan • Service Representatives in 88 Cities

DEAR EDITOR

Continued

the Nov. 24 issue, the temperature 1550° to 1600°F is changed to read 1550°F and if it is understood that the treating temperature of the 1 pct C, 2 pct Mn, 1 pct Cr, 1 pct Mo grade (curve D) air-hardenability chart, fig. 6, is 1550°F. Mr. Beeken's remarks are in order since he refers to tests made on production quantities. We will concede that the 1 pct C grade may harden consistently to about Rc 60 in sizes 4 in. round provided the hardening heat is high enough.

Our own experience with samples purchased in 1941 and induction melts made in several experimental programs indicate a required temperature range of 1600° to 1650°F for hardening these large sizes. At these temperatures, the matter of decarburization is important in these large sizes. It is necessary to be sure that the surface carbon is not down to 0.80 pct because then the surface of the piece will harden deeper in accordance with our remarks which prompted this discussion. As to our other statement regarding the limited application of these 1 pct C, manganese-chrome-molybdenum grades, this is relative and was made in view of the quantities of the three matched types manufactured by the tool steel industries as a whole."

FOUNDRY SHOES

We would like to know if you could furnish us any information regarding foundry shoes. The type shoe we are in need of is the closed front, with the elastic on the sides. We cannot use any shoe with the front lacings or the metal toe. Most of the companies that we have been able to get in touch with in regards to this matter would be able to furnish the type shoes we need but they would have to be bought in gross quantities. The amount of shoes we need at the present time would be 12 to 15 pairs.

JULIUS SANNINO
Tuckahoe Iron Foundry, Inc.
Tuckahoe, N. J.

A list of manufacturers of foundry shoes has been sent. You may be able to secure 12 to 15 pairs through a wholesaler.—Ed.

STACKING EQUIPMENT

Please send me any information you may have available covering details of equipment for conveying and stacking strip stock after shearing. We noticed the illustration of such equipment in THE IRON AGE, and feel that it might be adaptable to our work.

PAUL KEYES
Asst. Plant Supt.
Maytag Co.
Newton, Ia.

The steel strip stacking and conveying equipment you saw illustrated in THE IRON AGE is manufactured by Fried Steel Equipment Mfg. Co., 528 E. 119th St., New York 35. If you will write to the manufacturer mentioning THE IRON AGE, he will be only too happy to give you full information.—Ed.

FREE

PUBLICATIONS

Continued from Page 34

amount of steam required for atomization is described in 4-p. bulletin. *Crowe Engineering Co. For more information, check No.* 11 *on the postcard on p.* 35.

Casting Facilities

Neloy steel casting facilities including the large, medium, and small foundries, the machine shops and heat treating furnaces, along with strength specification charts of Neloy plain and molybdenum steels, are described in new 32-p. brochure. *National Erie Corp. For more information, check No.* 12 *on the postcard on p.* 35.

Delivery Pumps

Small size, large horsepower, pulsation-free delivery, hydraulic balance, and long life are the claimed advantages of the new line of 5000 psi continuous duty Superdraulic Junior constant and variable delivery pumps as described in 4-p. catalog. *Superdraulic Corp. For more information, check No.* 13 *on the postcard on p.* 35.

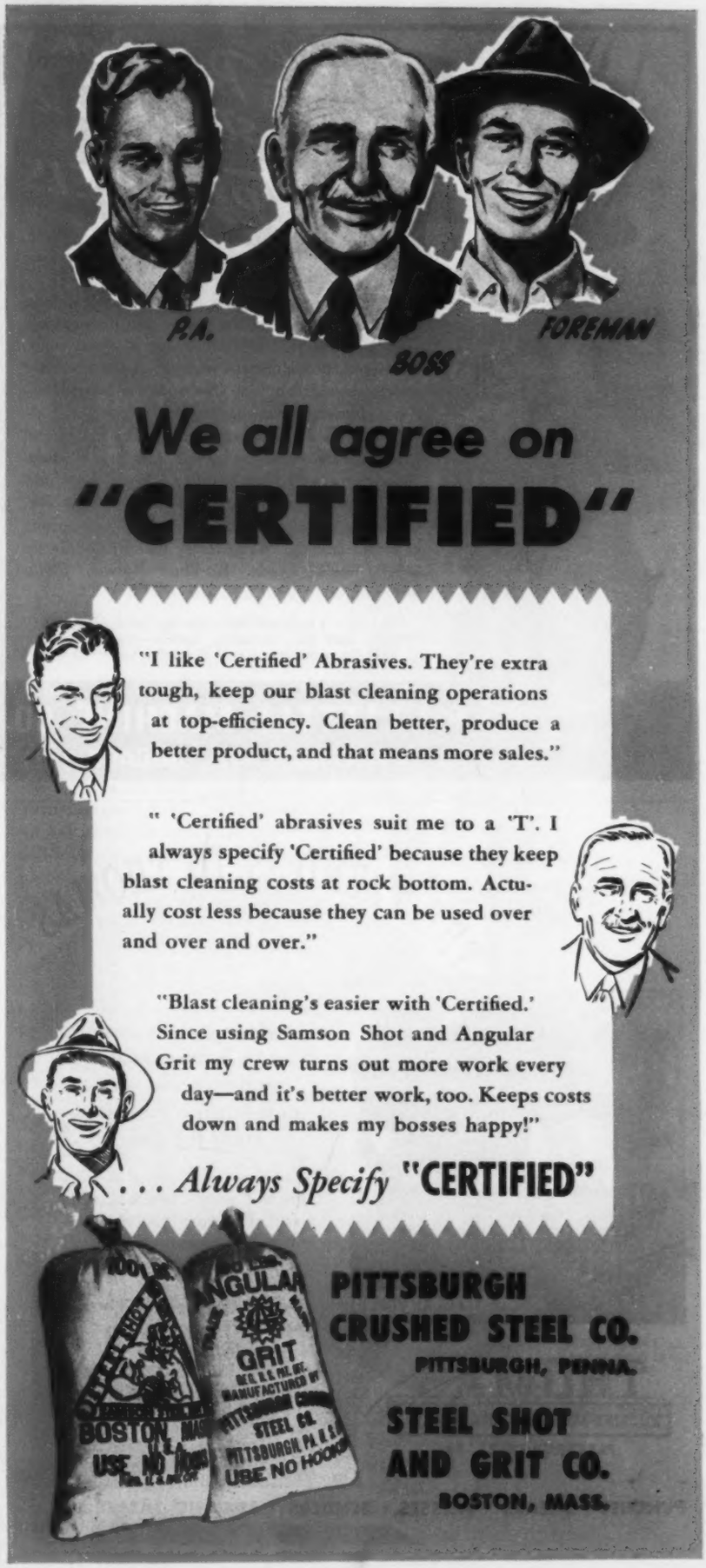
Screwdrivers and Bits

The line of Apex power bits and hand drivers for 6 types of screws are listed and described through use of photos and specification charts in 64-p. catalog. *Apex Machine & Tool Co.,* 1029 *So. Patterson Blvd., Dayton, Ohio.*

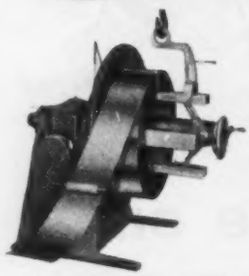
Cutting Tools

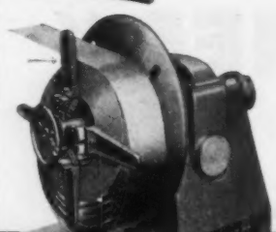
New catalog of carbide-tipped cutting tools illustrating side milling cutters, face mills, shell mills, end mill cutters, half side mills, keyseat cutters, fluted end mills, carbide tipped twist drills, masonry drills, drills for hard steel, slash milled tool bits and a variety of special tools is now available. *Nelco Tool Co. For more information, check No.* 14 *on the postcard on p.* 35.

Resume Your Reading on Page 35


P.A.
BOSS
FOREMAN
We all agree on
"CERTIFIED"
"I like 'Certified' Abrasives. They're extra tough, keep our blast cleaning operations at top-efficiency. Clean better, produce a better product, and that means more sales."
" 'Certified' abrasives suit me to a 'T'. I always specify 'Certified' because they keep blast cleaning costs at rock bottom. Actually cost less because they can be used over and over and over."
"Blast cleaning's easier with 'Certified.' Since using Samson Shot and Angular Grit my crew turns out more work every day—and it's better work, too. Keeps costs down and makes my bosses happy!"
. . . Always Specify "CERTIFIED"
GRIT
STEEL SHOT
PITTSBURGH
CRUSHED STEEL CO.
PITTSBURGH, PENNA.
STEEL SHOT
AND GRIT CO.
BOSTON, MASS.

If you operate a Press Room study these Littell REELS





HERE'S the way to speed up blanking, cupping, etc. Littell Reels enable you to use time-saving, money-saving coil stock in place of sheet stock. No more lost motion for continual insertion of new sheets. Less scrap, too. One operator using Littell Reels can tend several presses.

Littell Reels are self-centering. The heavy coil is always balanced for smooth, effortless feeding. They never over-run. Heads on No. 10 Reel and smaller are adjustable to any angle. Quick loading.

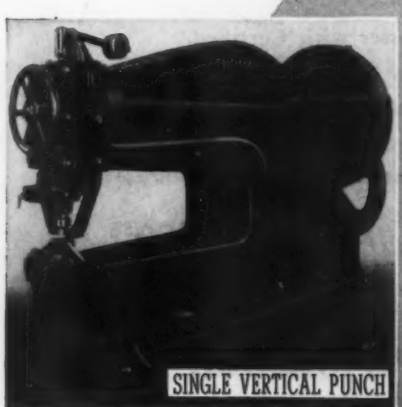
The Reels pictured are only three among dozens of Littell models. Write today for full details on Littell Reels, Feeds, Air-Blast Valves, Scrap Winders, etc. REQUEST BULLETINS.

Top—No. 3 Reel, 300 lbs. capacity. Center—No. 25 Reel, 2500 lbs. capacity. Bottom—No. 60 Reel, 6000 lbs. capacity.

F.J. LITTELL MACHINE CO.
4119 RAVENSWOOD AVE. CHICAGO 13, ILL.

THE TREND IS TO THOMAS

because . . .



modern frame design, bronze-lined ram guides, hand-scraped ways, anti-friction bearings, steel cut gears

. . all add up to better performance and greater production, the result of Thomas quality standards in construction.

Whether you need a Vertical, Horizontal, Beam or Multiple Punch, from 50 tons up, it is available from THOMAS, tooled to your individual requirements.

WRITE FOR BULLETIN 303

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH 23, PA.

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

23

NEW

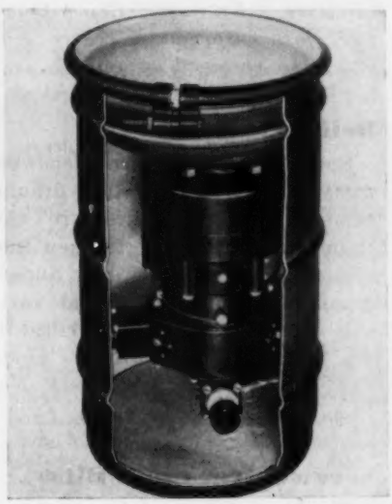
PRODUCTION IDEAS

Continued from Page 38

the burring tool and correctly staggers them so that fine granular chips that are harmless to operator hands are formed during buffing operations. *Pratt & Whitney. For more information, check No. 27 on the postcard on p. 35.*

Steel Containers

Reusable steel shipping and storage containers keep their contents ready for instant use. Product damage is kept to a minimum and corrosion and rust cannot touch

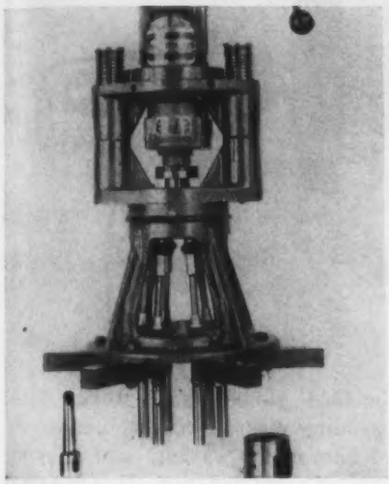


products sealed in these air tight containers. A little silica gel placed in the container prior to sealing is said to keep products ready for instant use, 10 to 20 years later. An inner pack holding the contents firmly in place allows an inch clearance on all sides. Mounting holes on the unit itself are used. The containers can be packed in pallet form. *Steel Drum Packaging & Acc. Inc. For more information, check No. 28 on the postcard on p. 35.*

Tap-or-Drill Unit

A standard multiple spindle adjustable drill head and a standard Dorman automatic reverse tapping attachment comprise a new multiple spindle drilling and tapping unit that attaches to any drill press

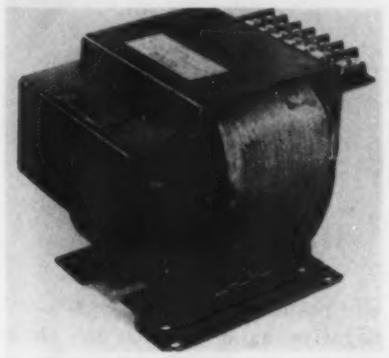
and will drill or tap an infinite number of patterns. To change the hole pattern, spindle bracket bolts are loosened, spindles are set in desired position, and bolts are locked. The unit taps multiple groups of holes on downward stroke



and automatically reverses on upward stroke of drill press spindle. Standard models are available with 2 to 10 spindles adjustable from ½ in. minimum centers within a 10⅜ in. diam circle. *Thriftmaster Products Corp. For more information, check No.* 29 *on the postcard on p.* 35.

Control Transformers

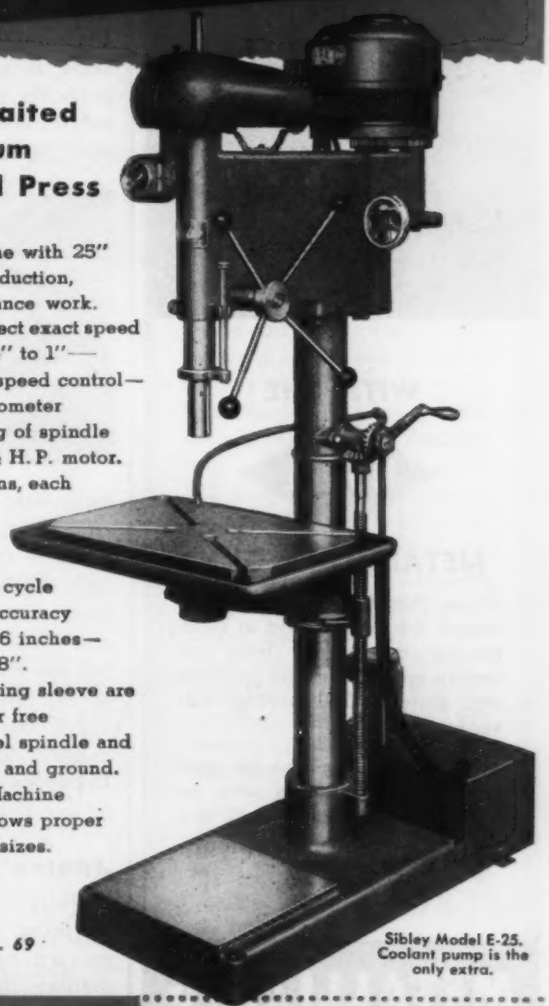
Adapted to the inductive, low power factor loads of solenoids, relays, and contactors making up machine tool control equipment, new Westinghouse machine-tool control transformers are available with 60



cycle secondary voltage that remains above 90 pct of rated voltage up to a load current of 7 times normal at 20 pct load power factor. Seven sizes from 0.075 to 1.5 kva are available for 220/440 v primary to 110 v secondary at 60

Fills long awaited need for medium weight Drill Press

Sensitive drilling machine with 25" swing for high speed production, yet suitable for maintenance work. Variable speed drive—select exact speed for any size drill from 1/8" to 1"—self-locking, convenient speed control—no belts to change—tachometer provides accurate reading of spindle speeds. Powered with 1½ H.P. motor. Five spindle speed options, each with a 4 to 1 range from a low of 206—825 R.P.M., to a high of 540—2160 R.P.M., with 3 phase 60 cycle motor. Oil groove table accuracy maintained to .0007" in 6 inches—maximum spindle travel 8". Splined spindle and driving sleeve are ball bearing equipped for free floating action. Alloy steel spindle and quill precision machined and ground. Column diameter 4½". Machine weight 765 lbs. Chart shows proper speeds for different drill sizes.



Sibley Model E-25. Coolant pump is the only extra.

Write for Catalog No. 69

SIBLEY
MACHINE & FOUNDRY CORP.
46 EAST TUTT STREET
SOUTH BEND 23, INDIANA

SIBLEY MACHINE & FOUNDRY CORP.
46 East Tutt St., South Bend 23, Indiana
Send Catalog No. 69, Free!

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Multiple Surface Defects Filled

WITH THE MOGUL METALLIZING GUN

Shows Mogul gun spraying 3# copper per hour, filling in small surface defects so brass or bronze castings can be polished and plated. 500 castings salvaged per hour.

Mogul F gun can also be used to spray self-bonding wire on small defects in cast iron and pattern build-up.

METALLIZING COMPANY OF AMERICA

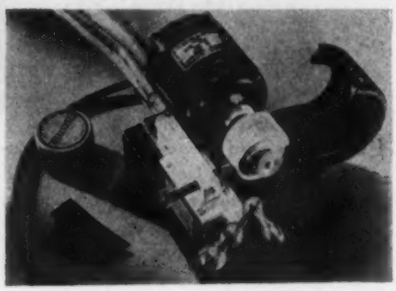
3520 W. CARROLL AVE.

CHICAGO 24, ILL.

cycles. Transformers for 50 cycle operation are available in six sizes ranging from 0.150 to 1.5 kva for 208/220/380/416/440 v primary to 110/95 v secondary. Three sizes from 0.150 to 0.500 kva are available for 25 cycle operation at 220/440/550 v primary to 110 v secondary. Use of grain-oriented magnetic steel Hipersil cores reduces size and weight and improves performance. *Westinghouse Electric Corp. For more information, check No* 30 *on the postcard on p.* 35.

Diamond Refacer

Trueing small abrasive wheels used with the Taber Abrasive Wear Tester is simplified with the new Diamond Refacer. The wheel refacer is said to dress the wheels perfectly true and restore them to perfect condition within a few minutes' time. Its operation necessi-



tates only the raising of the hood and clamping the wheels on the mandrel connected to the vacuum unit of the Abraser, lowering the hood and moving the diamond back and forth across the face by turning the handle attached to the lead screw. The refacer is driven by a 115-v, 50/60-cycle totally enclosed motor. *Taber Instrument Corp. For more information, check No.* 31 *on the postcard on p.* 35.

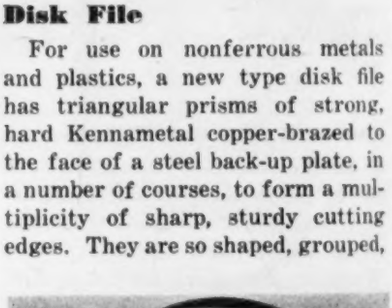
Junior Sander

Designed for light sanding, metal finishing, touch-up body work, removing rust, wood surfacing, and similar light-duty operations, the new 7-in. Junior Sander is a single handle model with a reversible side handle for either right or left-handed use. The tool is made of aluminum castings, has heat-treated gears and grease-sealed ball bearings, weighs 8 lb, has a no-load spindle speed of 3500 rpm, and is equipped with a spindle locking pin for speedy changes of sanding disks and other attachments. Standard equipment includes a 7-in.

molded rubber pad; three 7-in. sanding disks, 1 coarse, 1 medium, 1 fine; clamp washer; and a 3-conductor cable and plug. It is powered by a universal ac or dc motor available in 115 or 220 v. *Black & Decker Mfg. Co. For more information, check No.* 32 *on the postcard on p.* 35.

Disk File

For use on nonferrous metals and plastics, a new type disk file has triangular prisms of strong, hard Kennametal copper-brazed to the face of a steel back-up plate, in a number of courses, to form a multiplicity of sharp, sturdy cutting edges. They are so shaped, grouped,



and positioned as to provide a 30° negative axial rake, a 30° clearance angle, and 10° negative radial rake. This construction affords efficient and free cutting action. Six, 8, 10 and 12-in. diam files are available. *Kennametal Inc. For more information, check No.* 33 *on the postcard on p.* 35.

Resume Your Reading on Page 39

Dear Customer

by

Jack R. Hight

SEPTIC TANK EDITOR—The most fun that we have in this business is in surprising ourselves. Our Pittsburgh editor, John Delaney, recently gleaned a little item from one of his confidential news sources—about a special kind of steel septic tank.

Now we really didn't know how many people in this world are interested in septic tanks. The news staff here in New York, as well as our septic tank editor, Mr. Delaney, have been busy ever since answering inquiries about that little item.

Even that is not the full measure of interest. One of the companies involved writes to our tank man that ". . . Have received about a dozen inquiries from manufacturers as a result of the short article you wrote on septic tanks. One of these inquiries has led to an agreement with a manufacturer in Indiana to make and sell this knocked down tank, and negotiations are still being conducted with others."

It all serves to point up the importance of our man stationed in Pittsburgh. Although in recent years other steelmaking centers are becoming equally large, the location of headquarters for important steel and machinery firms in the Western Pennsylvania area makes the steel city one of our two most important listening posts. As in the case of the septic tanks, many new metalworking developments are uncovered by knocking on office doors in Pittsburgh.

Every editor wishes there was a slide rule formula to guide him in his work. But there is none. There is only one infallible rule. You have to keep calling on people in the metal industry, and keep talking to them about everything. If you don't get out and talk, you don't get the news.

That is the technique that our Pittsburgh bird-dog uses. He knows behind the glass partitions in the Oliver, Grant, Carnegie-Illinois, Jones & Laughlin, Farmers Bank, Union Bank, Koppers and a half dozen other office buildings there is plenty of news for THE IRON AGE. Our man John earns his check by making those rounds patiently and faithfully, talking and listening, and writing.

Although Mr. Delaney is a vereran of only 6 months with us, he has been covering the news in Pittsburgh for longer than he cares to mention. He is a veteran of many years with the United Press, Pittsburgh office, and also has a background of steel company public relations work before joining the staff of THE IRON AGE. May he find a new septic tank squib each week.

"Oakite's new method for cleaning brass and copper before nickel and chrome plating is tops!"

From Connecticut to California, electroplaters are enthusiastic about the NEW Oakite brass-cleaning method that gives good protection against tarnish along with effective removal of oils and buffing compounds. Here are a few comments:

Wonderful cleaner for brass . . . Results have been excellent . . . Not a single reject on brass and copper work in two months . . . Good cleaning combination . . . All parts plate perfectly . . . Worth its weight in gold . . . No discernible tarnish during anodic cleaning . . . Rejects at lowest point ever . . . Nickel plate extremely adherent, very bright and lustrous . . . Getting excellent results in automatic plating machine . . . 15 to 20 seconds reverse did perfect job . . . Much brighter plating, much better adhesion . . . Could not detect any tarnish . . .

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FATIGUE CRACKS

Continued from Page 20

slate of aptronymists (name fits the job) proposed and annotated by Hooker Electrochemical Co.'s A. Vaughan Chinnock:

Dr. H. R. Bird, poultry nutritionist associated with the government's experimental farm, Beltsville, Md. (Ref.: *Science Digest*, December, 1949, p. 40).

Dr. E. P. Learned, professor of business administration, Harvard Graduate School of Business Administration (Ref.: *National Petroleum News*, Nov. 16, 1949, p. 38).

H. M. S. Burns, president, Shell Oil Co. (Adv.: It's hot as H - - - when you heat with Shell).

George W. Coupe, auto dealer, Glenside, Pa. (*Sales Management*, Dec. 15, 1949).

For limited membership Reader Chinnock submits C. L. Barker, retiring vice-president, Hudson Paper Co., Winnipeg (*Paper Mill News*, Dec. 24, 1949, p. 18).

And from F. R. Yencer of Natco we have a suggestion that the Heet-Cartwright Co. of Richmond, Ind., might qualify for a corporate membership. They sell, and presumably haul, coal.

Puzzler

For the scrap man's answer to Seymour L. Samet's query, "Which would you rather have—a million dollars or one red cent doubled every day for one whole month?" we suggest you consult the metal price pages of your f.f.j. (adv.).

E. A. Bostrom of Pope Trading Corp., New York, brings up the case of the dishonest bellhop, a problem we have been pondering without success for at least 25 years. Three men go to a hotel for a room. The clerk says the charge is $30, so they each put up $10, and retire to their quarters.

A few minutes later, the clerk calls over a bellhop and says, "Give this $5 to those men who just went up and tell them I made an error on the cost."

The bellhop, having an eye for a quick buck, puts $2 in his pocket and returns only $3 to the three guests, telling them the room cost $27.

Here's the rub: The three guests each got a refund of $1, making the room cost them $27; the bellhop kept $2, making a total of $29. Considering that they originally paid $30, what happened to the other dollar?

Resume Your Reading on Page 21

Steel Users Tax Their Ingenuity to Save on Steel

New York—Purchasing Dept. and Method Dept. heads of sheet steel fabricators are examining closely the new price structure on cold-rolled sheets to determine whether or not advantage can be taken of the lower prices on wide sheet widths.

One point brought up by a heavy consumer of flat stock, however, was a union problem. It seems as though the company has a clause in its union contract permitting a man to handle a specific sized sheet, and anything above this maximum will mean trouble.

Thus, on the basis of new material specifications, the purchasing department makes a survey on the various sizes that can be ordered, either single or multiple widths, along with the price. The Methods Dept. then determines whether new equipment is necessary, manpower required for handling is available, etc., and obtains a relative price for this phase. In many cases, the cheapest raw material cost cannot be utilized because of additional labor and capital equipment investments.

Will Boost Tungsten Output

Washington—The Economic Cooperation Administration is making available some $322,000 to the Korean government to pay for purchases of American equipment for expansion of tungsten production at Sangdong. This deposit is believed to be one of the world's largest.

Installation of new and additional ore crushing, grinding and classifying equipment is expected to increase recovery of concentrates by about 100 tons a month.

Collecting Data on Metals

Washington—Beginning with 1950, the Census Bureau will collect and supply production and shipment data in the primary metal and several other industries on an annual basis. The report forms will also request unfilled order statistics for castings and forgings.

Low-Grade Alabama Ores Are Recovered by Flotation

Washington—According to the Bureau of Mines laboratory studies on beneficiating gray iron ores from Talladega Co., Ala., show that acceptable blast-furnace feed may be recovered from low-grade ores by flotation. The Bureau says the process may be of commercial importance. The report foresees the discovery of even more effective reagents through further research. The recovery of iron was 80 to 90 pct, with the resulting concentrate ranging from 50 to 60 pct iron. The iron content of the original ores ranged from 30 to 47 pct.

A free copy of the Report, "Flotation of Gray Iron Ores from the Talladega Area, Alabama, Laboratory Studies," may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

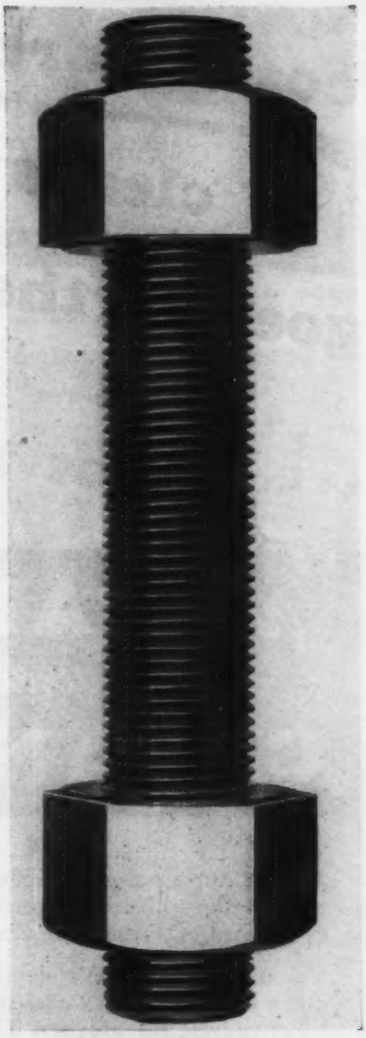
Releases Report on Cupola Dust

Cleveland—A report on cupola dust suppression based on a questionnaire mailed to smoke abatement and air pollution officials throughout the country was released recently by Gray Iron Founders' Society.

Prepared essentially to meet the needs of GIFS members in southern California who are under compulsion to meet the demands of local municipal regulations covering smoke abatement in about 30 days, the report contains background information on the industry and sets forth basic principles in dust suppression.

NISA Plans Biggest Meeting

Cincinnati—The biggest regional meeting ever held by the National Industrial Service Assn. is scheduled by the seventh region for Feb. 10 and 11 in Cincinnati. The meeting committee, F. W. Willey, S. F. High, and J. H. Hennequin, is planning for an attendance in excess of 200 dealers. Members and all eligible prospects in Ohio, West Virginia, and Kentucky are invited to attend.



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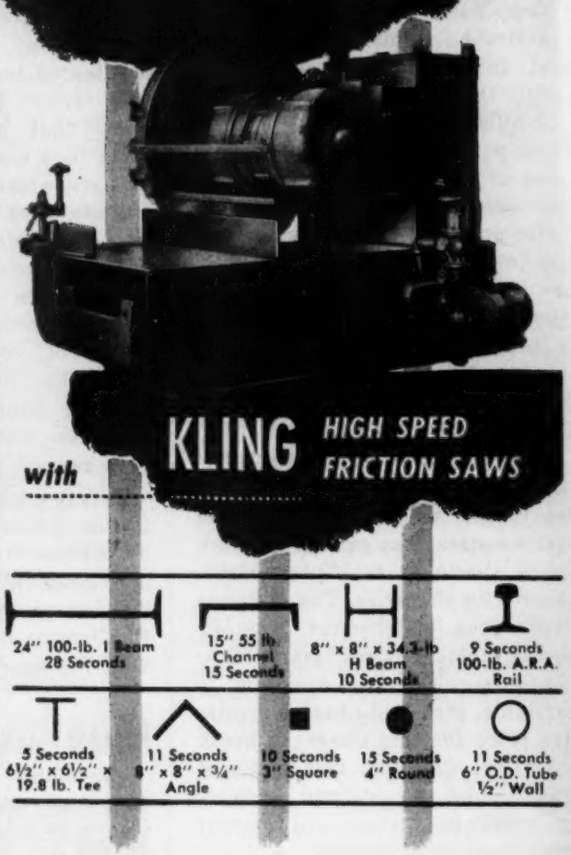

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Consult Kling engineers regarding your metal cutting problems. State size of material to be cut. Bulletin No. 9200 giving full particulars and suggestions as to the type and size of saw will be mailed promptly. No obligation.

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